



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>





<sup>A</sup>  
570.6

L758





THE  
PROCEEDINGS  
OF THE  
LINNEAN SOCIETY  
OF  
NEW SOUTH WALES.

---

(SECOND SERIES.)

---

VOL. II.

WITH THIRTY-NINE PLATES.

---

FOR THE YEAR 1887.

---

SYDNEY:

PRINTED AND PUBLISHED FOR THE SOCIETY

BY

F. CUNNINGHAME & CO., 146 PITT STREET,

AND

SOLD BY THE SOCIETY.

---

1888.



SYDNEY :

J. CUNNINGHAM AND CO., PRINTERS,

115-117, MARKET STREET.

# CONTENTS OF VOL. II.

## (SECOND SERIES.)

### PART I.

(Issued May 18th, 1887.)

	PAGE
On an Undescribed <i>Dules</i> from New Guinea. By E. P. RAMSAY, LL.D., &c., and J. DOUGLAS-OGILBY ... ..	4
A Glance at the Flora of Mount Wilson. By the Rev. W. WOOLLS, Ph.D., F.L.S. ... ..	6
Catalogue of the Described Coleoptera of Australia. Part VII. By GEORGE MASTERS ... ..	13
Note on Some Trilobites New to Australia. By F. RATTE, Ing. des Arts et Manuf., Paris. (Plates I. and II.). ... ..	95
Note on the Mode of Nidification of a Species of <i>Pachycephala</i> , supposed to be <i>P. Gilbertii</i> , from the Interior of N. S. Wales. By K. H. BENNETT ... ..	103
Flowering Seasons of Australian Plants. No. 3. By E. HAVILAND, F.L.S. ... ..	105
Notes on the Method adopted by the Female of the Common Fresh-water Tortoise, <i>Chelodina longicollis</i> , in the Excavation of the Burrows in which her Eggs are to be Deposited. By H. J. MCCOOEY ... ..	107
Miscellanea Entomologica, No. III. The Scaritidæ of New Holland. By WILLIAM MACLEAY, F.L.S., &c. ... ..	115
Flowering Seasons of Australian Plants, No. 4. By E. HAVILAND, F.L.S. ... ..	135
Notes on some Australian Fossils. By FELIX RATTE, M.E. :—	
(1) <i>Salisburia palmata</i> , emend. from <i>Jeanpaulia</i> or <i>Baiera palmata</i> , Ratte ... ..	137
(2) On the Muscular Impression of the Genus <i>Notomya</i> ( <i>Maconia</i> ). (Plate III.) ... ..	139
Note on a Remarkable Example of Fracture in Kerosene Shale. By FELIX RATTE, M.E. (Plate IV.). ... ..	140
Notes on the Bacteriological Examination of Water from the Sydney Supply. No. III. By Dr. OSCAR KATZ ... ..	151
Contributions towards a Knowledge of the Coleoptera of Australia, No. IV. Description of a new Genus and Species of <i>Oedemeridæ</i> . By A. SIDNEY OLLIFF, F.E.S. ... ..	153
On Some Additional Labyrinthodont Fossils from the Hawkesbury Sandstone of New South Wales. Second Note on <i>Platycephalus Wilkinsonii</i> . By Professor STEPHENS, M.A., F.G.S. ... ..	156
Additional Evidence on Fossil <i>Salisburia</i> from Australia. By F. RATTE, M.E. ... ..	159
On an Undescribed Shark from Port Jackson. By E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS OGILBY ... ..	163
List of Birds Collected at Derby, North-West Australia, by the late T. H. Boyer-Bower, Esq., with Notes. By Dr. E. P. RAMSAY, F.R.S.E., &c. ... ..	165
Elections and Announcements ... ..	1, 111, 146
Donations ... ..	1, 111, 146
Notes and Exhibits ... ..	109, 141, 174

a 69332



## PART II.

*(Issued August 31st, 1887.)*

	PAGE
Notes on the Genera of Australian Fishes. By E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS OGILBY. Part I. ....	181
Flowering Seasons of Australian Plants. No. 5. By E. HAVILAND, F.L.S. ....	185
On an Improved Method of Cultivating Micro-organisms on Potatoes. By Dr. OSCAR KATZ ....	187
Descriptive Record of two Plants additional to the Flora of Australia, and occurring also in New South Wales. By BARON VON MUELLER, K.C.M.G., M.D., F.R.S. ....	191
Bacteriological Observations made at the Little Bay Coast Hospital. By Dr. OSCAR KATZ ....	203
The Insects of the Cairns District, Northern Queensland. Part I. By WILLIAM MACLEAY, F.L.S., &c. ....	213
Description of a New Species of <i>Epimachus</i> , from the Astrolabe Range, S. E. New Guinea. By Dr. E. P. RAMSAY, F.R.S.E., F.G.S., &c. ....	239
Descriptions of New Australian Fishes. By E. P. RAMSAY, F.R.S.E., and J. DOUGLAS OGILBY ....	241
Remarks on an Introduced Species of Land-Planarian apparently <i>Bipulum Kewense</i> , Moseley. By J. J. FLETCHER, M.A., B.Sc. ....	244

# CONTENTS.

v.

## PART III.

(Issued November 30th, 1887.)

	PAGE
Report on a small collection of Plants from the Aird River, obtained by Mr. Theodore Bevan during his recent Expedition. Submitted by BARON VON MUELLER, K.C.M.G., M.D., Ph.D., F.R.S., &c. (Plates VI. and VII.)	419
General Remarks on Protective Inoculation for Bovine Pleuro-Pneumonia. By Dr. OSCAR KATZ	423
On some new Trilobites from Bowning, N.S.W. By JOHN MITCHELL. (Plate XVI.)	435
Contributions to the Oology of the Austro-Malayan and Pacific Regions. By A. J. NORTH	441
Notes on a Species of Rat ( <i>Mus Tompsonii</i> , Ramsay), now infesting the Western Portion of N.S.W. By K. H. BENNETT	447
Note on the Discovery of <i>Peripatus</i> in Gippsland. By J. J. FLETCHER, M.A., B.Sc.	450
Notes on some Indigenous Sago and Tobacco from New Guinea. By J. H. MAIDEN, F.R.G.S.	457
Notes on <i>Zelotypia Stacyi</i> , and an Account of a Variety. By A. SIDNEY OLLIFF, F.E.S., Assistant Zoologist, Australian Museum	467
A Revision of the Staphylinidæ of Australia. Part III. By A. SIDNEY OLLIFF, F.E.S., Assistant Zoologist, Australian Museum...	471
Miscellanea Entomologica, No. iv. The Helæides. By WILLIAM MACLEAY, F.L.S., &c.	513
Description of Two new Species of Marsupials ( <i>Perameles</i> and <i>Antechinus</i> ) and of a new Species of <i>Mus</i> ( <i>M. Burtoni</i> ), from the neighbourhood of Derby, N.W.A. By Dr. E. P. RAMSAY, F.R.S.E., F.G.S. (Plate XVII.)	551
Descriptions of the Eggs of Two Species of Australian Birds. By A. J. NORTH	554
Descriptions of new Australian Fishes. By Dr. E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS OGILBY	561
Flowering Seasons of Australian Plants, No. 7. By E. HAVILAND, F.L.S.	565
On Micro-Organisms in Tissues of Diseased Horses. By Dr. OSCAR KATZ	567
Observations on the Early Stages in the Development of the Emu ( <i>Dromæus Novæ-Hollandiæ</i> ). By WILLIAM A. HASWELL, M.A., D.Sc., F.L.S., Lecturer on Zoology and Comparative Anatomy, University of Sydney. (Plates VIII.-XV.)	576
Notes on Australian Earthworms, Part iv. By J. J. FLETCHER, M.A., B.Sc.	601
Elections and Announcements	416, 453, 558
Donations	416, 453, 559
Notes and Exhibits	450, 556, 621

## PART IV.

(Closed March 31st, 1885.)

	PAGE
Further Remarks on Phosphorescent Bacteria. By Dr. OSCAR KATZ	627
On a new Genus and Species of Labroid Fish from Port Jackson. By E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS GILLIN	631
Miscellaneous Entomologies, No. V. The Hübneres (continued). By WILLIAM MEYER, F.L.S., &c.	635
Description of a new Species of <i>Phalmon</i> from North-west Australia. By Dr. E. P. RAMSAY, F.R.S.E., &c.	676
Description of a new Species of <i>Gerygone</i> from Lord Howe's Island. By Dr. E. P. RAMSAY, F.R.S.E., &c.	677
Descriptions of the Eggs of Three Species of Sea Birds from Lord Howe's Island. By Dr. E. P. RAMSAY, F.R.S.E., F.L.S., &c.	678
Note on a Species of Polyzoa ( <i>Pozonia incerta</i> Waters) from Port Jackson. By I. WHITKER	680
On the Value of Coal. By the Rev J. E. TENISON-WOODS, F.G.S., F.L.S., &c. (Plates XVIII and XIX.)	685
A Contribution to the Herpetology of Queensland. By C. W. DE VILLIERS	811
Descriptions of two Australian Rhopalocera. By E. MEYER, B.A., F.F.S.	827
Review of Australian Lepidoptera. By E. MEYER, B.A., F.F.S.	

PART IV.—*Continued.*

	PAGE
On a new <i>Pielus</i> from the Blue Mountains. By A. SIDNEY OLLIFF, F.E.S., and HENRY PRINCE. (Plate xxxix.) ... ..	1015
Notes on Mr. Froggatt's Collections made during the year 1887 in the Vicinity of Derby, King's Sound, N.W. Australia. By WILLIAM MACLEAY, F.L.S., &c. ... ..	1017
Descriptions of two new Fishes from Port Jackson. By E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS OGILBY ... ..	1021
Note in Correction of certain Errors in Previous Papers. By Dr. E. P. RAMSAY, F.R.S.E., &c., and J. DOUGLAS OGILBY ... ..	1024
Jottings from the Biological Laboratory of Sydney University. By W. A. HASWELL, M.A., D.Sc. ... ..	1025
No. 9. Notes on <i>Tmesipteris</i> and <i>Psilotum</i> .	
No. 10. On the Embryology of <i>Vermilia cæspitosa</i> , and <i>Eupomatus elegans</i> .	
List of Hepaticæ collected by Mr. T. Whitelegge in New South Wales, 1884-85. By B. Carrington, M.D., F.R.S.E., and W. H. PEARSON. (Plates xxii.-xxxvii.) ... ..	1035
Contributions to Conchology, No. I. By JAMES C. COX, M.D., F.L.S. (Plates xx., xxi.) ... ..	1061
On a Supposed New Species of <i>Nototherium</i> . By C. W. DE VIS, M.A. (Plate xxxviii.) ... ..	1065
Notes on a new Dipterous Insect belonging to the Family Cecidomyiadae infesting Grass. By F. A. A. SKUSE ... ..	1071
A Note on <i>Echinaster decanus</i> , M. & T. By Professor JEFFREY BELL, M.A., &c. ... ..	1074
Note on <i>Danaïs Petilia</i> , Stoll, and <i>D. chrysippus</i> , Linn. By GEORGE MASTERS ... ..	1076
Notes on an Exhibit of Rocks and Rock-sections. By T. W. E. DAVID, B.A., F.G.S.—	
(1) On the Occurrence of Basalt-glass (Tachylyte) in the Vegetable Creek district, New England ... ..	1078
(2) Note on the Occurrence of Dacite at Moss Vale ... ..	1083
(3) On a Pitchstone from Port Stephens, showing faint perlitic structure ... ..	1084
(4) On the Occurrence of Chiastolite in a Stone Hatchet found at Strathbogie, near Vegetable Creek ... ..	1084
Elections and Announcements ... ..	622, 682, 983
Donations ... ..	622, 682, 983
Notes and Exhibits ... ..	680, 978, 1074
President's Address ... ..	1086
Office-bearers and Council for 1888 ... ..	1113
Title-page, Contents, Index to Vol. II. (2nd Ser.), and Errata.	

*Note.*—Figures 7-12 of Plate xvi., which appears in this Part of the Proceedings, are intended to illustrate a paper not yet published.

## ERRATA.—VOL. II. (SECOND SERIES).

---

- Page 120, line 2 —for *punctatum* read *panotulatum*.  
Page 122, line 32—*for* *lacunatum* read *lacunosum*.  
Page 164, line 11—*for* *Stigmatoris* read *Stigmatops*.  
Page 192, line 11—*for* *quadriform* read *quadrifaria*.  
Page 214, line 14—*for* *Dystipsidera* read *Distyrsidera*.  
Page 250, line 23 —*for* *stone* read *stone*.  
Page 297, line 16 —*for* *Warmbra* read *Wurmbea*.  
Page 406 , line 19 —*for* *strictus* read *striata*.

PROCEEDINGS  
OF THE  
LINNEAN SOCIETY  
OF  
NEW SOUTH WALES.

---

WEDNESDAY, 26<sup>TH</sup> JANUARY, 1887.

---

The President, Professor W. J. Stephens, M.A., F.G.S., in the Chair.

---

MEMBERS ELECTED.

The following gentlemen were elected Members of the Society :—  
Mr. William J. Mackay, Rooty Hill; Mr. H. H. Lane;  
Dr. Casement, Trial Bay Gaol; Mr. Thomas Hewitt Myring;  
Mr. E. Betche, Botanic Gardens, Sydney.

---

The President announced that no excursion would be held  
during the ensuing month owing to the heat.

---

DONATIONS.

“The Scottish Geographical Magazine.” Vol. II, Nos. 11 and 12,  
(1886). *From the Hon. William Macleay, F.L.S.*

“Zoologischer Anzeiger.” Jahrg. IX., Nos. 238, 239, (1886).  
*From the Editor.*



"The Quarterly Journal of the Geological Society, of London." Vol. XLII Part 4 (No. 168), November, 1886. List of the Geological Society of London, 1886. *From the Society.*

"Prodrromus systematis naturalis regni vegetabilis." By A. P. de Candolle. Parts I-VI. *From Baron Ferd. von Mueller K.C.M.G., F.R.S., M.D., &c.*

Proceedings of the Zoological Society of London for the year 1886 " Part III , "Abstract of Proceedings." November, 1886. *From the Society.*

"Feuille des jeunes Naturalistes." No. 194, 1st December, 1886. *From the Editor.*

"Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CIII., Nos. 13-16. *From the Academy.*

"Abhandlungen herausgegeben von der Senckenbergischen naturforschenden Gesellschaft. Bd. XIV., Heft. 1, (1886). *From the Society.*

G. C. Mundy. (2 Vols.) ; "Geological observations in South Australia." By the Rev. Julian E. Woods, F.G.S., &c. ; "A Statistical Account of the British Settlements in Australasia, including the Colonies of New South Wales and Van Diemen's Land." By W. C. Wentworth. (2 Vols.) ; "Transactions of the Zoological Society of London." Vol. IX., Parts, 9, 11 ; Vol. XI., Part 5. General Index, Vols. I.-X. ; "Contributions to the Anatomy of the Central Nervous System in Vertebrate Animals." By Alfred Sanders, M.R.C.S., &c. ; "The Voyage of Governor Phillip to Botany Bay, with an account of the establishment of the colonies of Port Jackson and Norfolk Island. *From Dr. James C. Cox, F.L.S.*

"Revue Coloniale Internationale." Tome III., No. 6, (1886). *From l'Association Coloniale Néerlandaise à Amsterdam.*

"Naturhistorisches Museum zu Hamburg — Bericht des Direktor" (1885). *From the Director.*

"Bulletin de la Société Belge de Microscopie." 13 me. Année. No. 1. *From the Society.*

"Mémoires (*Zapiski*) de la Société des Naturalistes de la nouvelle Russie." Tomes I-VIII. (1873-1883). Tome XI. Part 1 (1886) ; "Flora Chersonensis." By E. A. Lindemann. Vol. II. *From the Society.*

"Journal of the Royal Microscopical Society of London." Ser. ii., Vol. VI. Part 6. December, 1886. *From the Society.*

"Descriptions of Sponges from the neighbourhood of Port Phillip Heads, South Australia." (Nine Pamphlets). By H. J. Carter, Esq., F.R.S. *From the Author.*

"Victorian Naturalist." Vol. III, No. 9 (1887). *From the Field Naturalists' Club of Victoria.*

**DULES NITENS. sp. nov.**

B. vi.: D. 10/11: A. 3/11: V. 1/5: P. 14: C. 17  
1-53: L. trans. 5/13: Vert. 10/15.

Length of head  $4\frac{1}{8}$ , of caudal fin  $4\frac{3}{8}$ , height of body  $3\frac{1}{4}$  the total length. *Eye*—large, its diameter  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in the head,  $\frac{4}{7}$  of a diameter from the end of the snout, and the same apart. Interorbital space almost flat. Snout with slight concavity; occiput rugose, terminating posteriorly in a low angular ridge. Lower jaw much the longer; cleft of the mouth of moderate size, and oblique. The maxilla reaches to beneath the anterior third of the orbit, and is dilated and rounded posteriorly into a circle with two flat pungent spines, the lower of which is the longer; sub- and inter-opercle very finely serrated, the former becoming obsolete in old examples; preopercle with fine serrations on both limbs, those on the rounded and slightly produced upper edge the strongest; lower edge of preorbital, and post-temporal bones finely serrated. *Teeth*—Villiiform on jaws, vomer and palatines. *Fins*—dorsal spines moderately strong, increasing in height to the fifth, which measures  $\frac{5}{8}$  of that of the head; from the fifth they decrease quickly in height to the ninth, which is about half the last; the rays are not nearly so high as the spines.

the 34th, while the anal commences beneath the 22nd and ends beneath the 37th ; the second anal spine is equally strong, but not so long as the third, which is rather more than  $\frac{2}{3}$  of that of the head : the ventral fin is strong, truncate behind, not quite reaching to the vent ; the pectoral fin is short, less than  $\frac{1}{2}$  of the total length, and reaches to the 13th lateral line scale : caudal forked. *Scales*—moderate, ctenoid, firmly adherent ; 11 rows between base of ventral fin and lateral line, 4 between the orbit and the preopercular angle, and 3 across the opercle ; dorsal and anal fins with a basal scaly sheath ; pectorals with a small basal patch outside ; caudal covered with minute scales almost to the tips of the lobes. Upper and under surfaces of the head, orbital ring, maxilla, and the margins of the opercle and preopercle scaleless. *Lateral line*—but slightly curved, its tubes simple. *Pseudobranchiæ*—well developed. *Gill-rakers*—long and slender, about 36 in number, the longest being almost  $\frac{1}{2}$  a diameter of the orbit. The length of the abdominal portion of the vertebral column is to that of the caudal as 1 to 1.72. *Colors*—uniform silvery, the back washed with green ; fins immaculate.

The fishes from which the above description was taken are three in number, and measure individually from  $9\frac{1}{2}$  to  $10\frac{2}{3}$  inches in length. They belong to a collection purchased by the Australian Museum from Mr. Cairns, and were obtained by him on the South-east coast of New Guinea. Register number of type specimen 1. 945.

The Mount Wilson platform which is 83 miles from  
.478 feet above the sea-level, stands at the terminatic  
ne from Richmond, and is about five miles westw  
ountain from which it takes its name. As, how  
ountry between the platform and the mountain is v  
nd impracticable, the road is somewhat circuitous and  
miles in length. In travelling towards the mountain, the  
for the most part of Hawkesbury sandstone, and the pla  
e general observer rather uninteresting when compared  
xuriant vegetation of the disintegrated trap. The Euc  
r as I had an opportunity of examining them along the  
ose known by the popular names of "Peppermint" (*E.*  
1.), "White Gum" (*E. hæmastoma*, Sm.), "Mounta  
. *Sieberiana*, F. v. M.), "Mountain White Gum" (*E. p*  
b.), "Stringy Bark" (*E. capitella*, Sm.), and a "Scrubb  
*stricta*, Sieb.). With the exception of the last, whic  
shes on the elevated parts of the Blue Mountains, t  
ies are trees of moderate size, none of them attain  
ch they do in more favourable localities. The Prote  
represented by numerous species of *Hakea*, *Persoonia*, (  
*ksia*, *Symphyonema*, *Isopogon*, *Petrophila*, *Conos*  
*atia*, *Lambertia*, and the far-famed *Telopea* or Warata  
s of *Hakea* and *Persoonia* seemed larger than those o  
es in the low country, one of the former (appare  
sa, Cas.), measuring  $2\frac{1}{2}$  inches in length. and mor  
2 in circumference.

(Sm.), and also *Eriostemon obovalis* (A. Cunn.). The latter has very delicate flowers, which have sometimes been found double. As the season for flowering had nearly past (December), the Leguminous shrubs were not so conspicuous as they had been a month or so earlier; but the species of *Daviesia*, *Dillwynia*, *Mirbelia*, *Indigofera*, *Pultenaea*, *Gompholobium*, and *Sphærolobium*, were evidently very numerous; whilst five or six kinds of *Acacia* were in fruit. The interesting terrestrial Mistletoe, *Atkinsonia ligustrina*, F. v. M., (a plant ever to be associated with the name of the excellent lady who did so much to develop the natural history of the Kurrajong), was abundant on the sandstone. By some botanists, this plant has been supposed to germinate on the roots or decaying branches of trees, but so far as could be ascertained, *A. ligustrina* is an independent terrestrial shrub. The flowers are of a yellow or orange colour, the leaves occasionally opposite, and the fruit 8-ribbed, protruding into deep furrows, so as to give it the appearance of being 8-celled. In addition to the trees of the Myrtaceæ already mentioned, several species of *Leptospermum*, *Callistemon*, *Bæckia*, *Darwinia*, and *Kunzea* were seen on the ridges, but none of them seemed to differ from the species near Sydney. *Tetratheca ericifolia* (Sm.), with which Baron Mueller unites *T. thymifolia* (Sm.), and *T. pilosa*, (Labill.), is on the mountains a solitary representative of an order widely distributed in Western Australia; whilst *Bauera rubioides* (Andr.), of the Saxifrageæ, and *Monotaxis linifolia* (Brongn.), of Euphorbiaceæ, were collected in moist places. Of the Santalaceæ, *Leptomeria acida* (R. Br.), *Omphacomeria acerba* (A. DC.), and *Choretrum Candollei* (F. v. M.), were frequent, as well as several species of the Goodeniaceæ, *Goodenia barbata* (R. Br.), *G. bellidifolia* (Sm.), *G. heterophylla* (Sm.), *Dampiera stricta* (R. Br.), and *D. Brownii* (F. v. M.); whilst of the Epacrids, *Epacris*, *Leucopogon*, *Monotoca*, and *Brachyloma* were represented by a few species. The terrestrial Orchids had nearly passed away, but I was able to recognise *Prasophyllum flavum* (R. Br.), (a much larger plant than that figured by Mr. Fitzgerald), *P. nigricans* (R. Br.), *Orthoceras strictum* (R. Br.), *Cryptostylis leptochila* (F. v. M.),



and *Stypanandra cæspitosa* (R. Br.) were the only plants of this family which I observed. The following species also were enumerated, *Ionidium floribundum* (Walp.), of the *Trachymene ericoides* (Sieb.) and *T. Billardieri* (F. v. N.) of the *Umbelliferae*, *Lobelia gibbosa* (Labill.) of the *Campylotropis*, *Litrasacme pilosa* (Labill.), of the *Loganiaceae*, *Sebania* (R. Br.) of the *Gentianeae*, *Pomaderris ledifolia* (A. Cunningham), and several species of *Hibbertia* of the *Dilleniaceae*. The composites are numerous, but the most remarkable are *Leucosiphon denticulata* (R. Br.), *C. aurea* (R. Br.), *Humea* (R. Br.), *Senecio australis* (Willd.), and *Helichrysum elatum* (R. Br.). The native grasses did not appear to be abundant. The only species which I collected were *Microloena stipoides*, *Isopogon avenaceus* (R. Br.), *Cinna ovata* (Kunth.), *Amphipogon* (R. Br.), *Danthonia semiannularis* (R. Br.), and *Capriola* (Forst.). Not far from the Road, I saw *Glinum* (Sw.), and the Lycopods *Lycopodium densum* (L.) and *Selaginella uliginosa* (Spreng.), but these were not so common as I have found in the Manly swamps. Before I passed through the Hawkesbury Sandstone, two species of *Casuarina* were noticed, *C. nana* (Sieb.), and *C. distyla* (Vent.), both common, and also a *Frenela*, which Baron von Mueller considers a diminutive form of *F. Muelleri* (Parlat.), a pine found very common and plentiful on the banks of George's River.

As we reach the foot of Mount Wilson about 300 or 400 feet above the summit or table-land, the character of the vegetation

---

undergoes a remarkable change, and the traveller, as he ascends the Zig-Zig, passes through an avenue of trees and shrubs differing materially from those on the sandstone, though it must be observed that some of the plants which I have mentioned are common to that and the trap formation. Nothing can exceed the verdure and beauty of the scene, and though the species are for the most part common to Mount Wilson and Mount Tomah, yet no part of the Blue Mountains seems equal to the former in its natural features, or its suitability for the cultivation of European trees, shrubs, fruits, and grasses. On both sides of the road, the beautiful *Prostanthera lasiantha* (Labill.) was in full bloom. This is the largest of Labiates, and from the scent of its foliage is sometimes called the "Mint Tree," forming a pleasing relief to the darker shades of the shrubs, and a contrast to the semi-tropical character of the Tree-ferns which now begin to appear in great abundance. The fertility of the soil at Mount Wilson is evidenced not only by the indigenous vegetation, and the vigorous growth of cultivated plants; but the rapid way in which European and Asiatic weeds are spreading is also an indication of the fact. *Hypochaeris glabra* (Linn.), *Galinsoga parviflora* (Cav.), *Siegesbeckia orientalis* (Linn.), and *Silene gallica* (Linn.), are following the steps of cultivation; whilst the grasses *Poa pratensis* (Willd.), *Dactylis glomerata* (Willd.), *Cynosurus cristatus* (Willd.), as well as several foreign clovers, have already established themselves on the Mount.

The Botany of Mount Wilson is very similar to that of Tomah, and as the observer views the gigantic Eucalypts, the graceful Tree-Ferns (*Dicksonia antarctica*, *Alsophila Australis*, and *A. Leichhardtiana*), the robust climbers, and the epiphytal orchids of the sombre woods, he is forcibly reminded of Allan Cunningham's trip to Mount Tomah in 1823, and of the plants which that eminent Botanist discovered there (See *Hooker's Journal of Botany*, Vol. 4, p. 285). Cunningham tells us, that owing to the weakness of his horses and the difficulty of the track then recently found by a surveyor, he did not proceed to Cox's River as he had originally intended; but, after having advanced a few miles further, he returned to his encampment at Tomah, which he adds,

"from the permanency of its shade and the general humidity of the atmosphere on its elevated summit, rendered the peculiar character of its vegetation most interesting to him." After the lapse of more than half a century, little can be added to the account which Cunningham has furnished of the germination of *Quintinia Suberi* (A. DC.) on the caudices of *Dicksonia antarctica*, of the eccentric climbing rooted-stemmed plant *Fieldia australis* (A. Cunn.), and the stupendous size and marvellous contortions of the large climbers; but, in the progress of science, especially through the labours of Baron F. von Mueller, the Eucalypts to which he refers have been duly classified, whilst many of the plants, which he knew but imperfectly, have been reduced to their proper places in the systematic arrangement.

The highest trees on Mount Wilson are probably the Stringy Barks (*E. microthyncha*, F. v. M.), some of which are probably 150 feet high, with a circumference of 22 feet at the lower part of the butt. This species, though allied to the other Stringy Barks (*E. eumecoides*, Steb. and *E. capitella*, Sm.), is

it is used for many industrial purposes. The same may be said of *Acacia melanoxylon* (R. Br.), and *A. elata* (A. Cunn.), which rise to a considerable height, and afford excellent timber for carpentry and cabinet work. *Doryphora sassafras* (Endl.) is often characterised as a beautiful aromatic tree. Its wood, indeed, is fragrant but not durable, and an infusion of its bark is used as a tonic. *Quintinia Sieberi* is also a fine ornamental tree, growing in company with the preceding trees, and its wood is useful for cabinet work. *Eugenia Smithii* (Poir.) or the "Myrtle," rises to the height of 40 or 50 feet in the chocolate soil: its timber is hard and close-grained, and useful for carpentry, handles, and staves. *Myrsine variabilis* (R. Br.), and *Hedycarya angustifolia* (A. Cunn.), though merely shrubs in many parts of the colony become trees of some size in the fertile soil of Mount Wilson, but their wood, especially that of the latter, is soft and of little value. *Fieldia australis*, which Cunningham first noticed at Mount Tomah, is very abundant on Tree-ferns and other trees; and the climbers of which he speaks in general terms appear to be *Vitis hypoglauca* (F. v. M.), *Lyonsia straminea* (R. Br.), *L. reticulata* (F. v. M.), and *Tecoma australis* (R. Br.), *Marsdenia rostrata* (R. Br.), and *Tylophora barbata* (R. Br.), are smaller and twining plants. Some of the climbers seem to kill the young trees on which they ascended to others, and hang down from lofty branches as if they had attained their position by some unseen agency. In the shady woods I noticed the "Kangaroo Apple" *Solanum aviculare* (Forst.), *Coprosma Billardieri* (Hook.), sometimes called "Currant," and *Smilax australis* (R. Br.), the "Australian lawyer." Of the epiphytal Orchids, *Dendrobium teretifolium* (R. Br.), *D. pugioniforme* (A. Cunn.), and *Sarcochilus falcatus* (R. Br.) were the only species which I was fortunate enough to see, but no doubt many more remain to be observed. I picked up on the ground a fragment of *Viscum articulatum* (Burm.) which must have fallen from one of the lofty trees, and also some leaves, as they appeared to be, of *Litsea dealbata* (Nees.), *Elæocarpus holopetalus* (F. v. M.), and *Banksia integrifolia* (Linn.), but of these better specimens are needed for identifying the species.

6235 **BANKSIÆ** W. S. Macleay, King's Surv. Au.  
1827, p. 447, t. B. f. 1; Gray, Griff. J.  
Ins. II. p. 126, t. 67, f. 1; Boisd. Voy  
1835, p. 297; Lacord. Mon. p. 13.  
N. S. Wales.

6236 **EXCAVATUS** Baly, Trans. Ent. Soc. 1871, p. 38.  
W. Australia.

**POLYOPTILUS.** Germar.

6237 **ERICHSONI** Germ. Linn. Ent. III. 1848, p. 231  
*uber* Newm. The Zoologist, 1851, p. cxxxix.  
*xanthurus* Newm. The Zoologist, p. cxxxix.  
S. Australia.

6238 **LACORDAIREI** Germ. Linn. Ent. III. 1848, p. 231  
*decolor* Newm. The Zoologist, 1851, p. cxl.  
S. Australia.

6239 **PACHYTOIDES** Baly, Cist. Ent. II. p. 47.  
W. Australia.

6240 **PASCOEI** Baly, Cist. Ent. II. p. 47.  
W. Australia.

6241 **WATERHOUSEI** Baly, Cist. Ent. II. p. 46.  
W. Australia.

**DIAPHANOPS.** Schönherr.

6242 **WESTERMANNI** Bohem. Schönh. Gen. Chiro VI

MECYNODERA. Hope.

6243 BALYI Clark, Journ of Ent. II. 1864, p. 248, t. 12, f. 1 ;  
Westw. Trans. Ent. Soc. ser. 3, II. 1864, p. 271.  
N. S. Wales.

6244 COXALGICA Boisd. Voy. Astrol. Col. 1835, p. 535 ; Lacord.  
Mon. p. 17.  
*picta* Hope, The Col. Man. III. 1840, p. 182, t. 2, f. 6.  
*Spinolæ* Sturm. Cat. 1843, p. 357, t. 6, f. 7.  
var. *Kingi* Gray, Griff. Anim. Kingd. Ins. III. t. 67, f. 2.  
N. S. Wales.

AMETALLA. Hope.

6245 SPINOLÆ Hope, The Col. Man. III. 1840, p. 180, t. 2, f. 5 ;  
Lacord. Mon. p. 88.  
Swan River, W. Australia.

6246 STENODERA Lacord. Mon. Mém. Soc. Liége, III. 1845, p. 89.  
W. Australia.

6247 W-NIGRUM Westw. Trans. Ent. Soc. ser. 3, II. 1864, p. 272.  
W. Australia.

Sub-Family. CRIOCERIDES.

LEMA. Fabricius.

6248 BIFASCIATA Fabr. Syst. Ent. p. 120, 12 ; Oliv. Enc. Méth.  
VI. p. 199 ; Ent. VI. 94, p. 734, t. 1, f. 11 ; Coqueb.  
Ill. Ins. III. p. 125, t. 28, f. 11.  
*Australis* Gmel. Ed. Linn. I. 4, p. 1721, 153.  
Australia.

6249 CAMELUS Duviv. Soc. Ent. Belg. 1884, Bull. p. cccx.  
Australia.

6250 FLAVOSIGNATA Jac. Ann. Mus. Gen. XX. p. 190.  
Cape York, N. Australia.

6251 FRONTALIS Baly, Ann. Nat. Hist. 1862, p. 17.  
Lizard Island, N. E. Australia.



16 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

- 6252 OCULATA Fabr. Syst. Ent. 1775, p. 121 ; Syst. El. I. p. 458 ;  
Oliv. Enc. Méth. VI. 1791, p. 200 ; Ent. VI. 94, p. 735,  
t. 1, f. 13 ; Lacord. Mon. p. 541.

Australia.

- 6253 PURA Clark, Cat. Phyt. 1866, p. 27.

*immaculata* Clark, Cat. Phyt. App. 1865, p. 38.

Moreton Bay, Queensland.

- 6254 RUFOTINCTA Clark, Cat. Phyt. App. 1865, p. 36.

N. S. Wales.

- 6255 TOGATA Lacord. Mon. p. 343 ; W. S. Macleay, Dej. Cat.  
3 ed. p. 386.

Australia

- 6256 UNIFASCIATA Fabr. Syst. Ent. 1775, p. 120 ; Syst. El. I.  
p. 476 , Oliv. Enc. Meth. VI. 1791, p. 199 ; Ent. VI.  
94, p. 735, t. 1, f. 12 ; Lacord. Mon. p. 539.

Australia

MACROLEMA. Baly.

- 6262 VITTATA Baly, Journ. of Ent. I. 1861, p. 275 t. 13, f. 1.  
Moreton Bay, Queensland.

Sub-Family. CLYTRIDES.

DIAPHROMORPHA. Lacordaire.

- 6263 CRYPTOCEPHALOIDES Lacord. Mon. Mém. Liège, 1848, p. 315.  
Australia.
- 6264 SEXNOTATA Fabr. Syst. El. II. p. 31, 12 ; Oliv. Ent. VI. 96,  
p. 865, t. 2, f. 29 ; Suffr. Stett. Zeit. 1851, p. 216.  
Australia.

Sub-Family. CRYPTOCEPHALIDES.

LACHNABOTHRA. Saunders.

- 6265 BRACCATA Klug, Ent. Mon. p. 159, t. 6, f. 9, ♂ ; Suffr.  
Gen. Col. X. p. 192, note 1.  
S. Australia.
- 6266 BREWERI Baly, Trans. Ent. Soc. 1871, p. 393.  
Swan River, W. Australia.
- 6267 DISTINCTA Baly, Trans. Ent. Soc. 1871, p. 393.  
S. and W. Australia.
- 6268 DUBOULAYI Baly, Trans. Ent. Soc. 1871, p. 399.  
W. Australia.
- 6269 HOPEI Saund. Trans. Ent. Soc. IV. 1847, p. 295, t. 15, f. 5 ;  
Suffr. Mon. XIII. p. 85 ; Baly, Trans. Ent. Soc. 1871,  
p. 392.  
Victoria.
- 6270 INTEGRA Baly, Trans. Ent. Soc. 1871, p. 394.  
Adelaide, S. Australia.
- 6271 SAUNDERSI Baly, Trans. Ent. Soc. 1871, p. 397.  
Australia.

20 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6300 ACICULATUS Chap. Soc. Ent. Belg. XVIII. p. LXXVIII.  
Australia

6301 ENFIPENNIS Boisd. Voy. Astrol. Col. p. 588; Dej. Cat.  
3 ed. p. 449.  
Australia.

6302 ALBERTUS Chap. Ann. Mus. Gen. IX. p. 337.  
Cape York, N. Australia.

6303 AMABILIS Baly, Ann. Nat. Hist. ser. 4, XX. p. 383.  
Cape York, N. Australia.

6304 ANGUSTIPENNIS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXX.  
Australia.

6305 ANTENNARIUS Chap. Journ. Mus. Godeffr. XIV. p. 76.  
Gayndah, Queensland.

6306 ANTENNARIUS Baly, Ann. Nat. Hist. ser. 4, XX. p. 382.  
Morton Bay, Queensland.

- 6314 *CANESCENS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXV.  
Australia.
- 6315 *CAVIFRONS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXXI.  
Australia.
- 6316 *CARBONARIUS* Baly, Trans. Ent. Soc. 1871, p. 384.  
W. Australia.
- 6317 *CÆRULESCENS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVIII.  
Australia.
- 6318 *COMANS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXV.  
Australia.
- 6319 *COMPTUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXV.  
Australia.
- 6320 *CONCOLOR* Saund. Trans. Ent. Soc. IV. ser. 4, 1847, p. 269.  
*ater* Saund. Trans. Ent. Soc. IV. ser. 4, 1847, p. 270.  
*cistellus* Germ. Linn. Ent. III, 1848, p. 242 ; Suffr. Mon.  
XIII. p. 28.  
Victoria and S. Australia.
- 6321 *CORNUTUS* Baly, Ann. Nat. Hist. ser. 4, XX. p. 384.  
Australia.
- 6322 *COSTATUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXII.  
Australia.
- 6323 *COSTATIPENNIS* Baly, Journ. Linn. Soc. XIII. p. 465.  
Champion Bay, W. Australia.
- 6324 *CUNEATUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVI.  
Australia.
- 6325 *CUPREUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVIII.  
Australia.
- 6326 *DAWISI* Saund. Trans. Ent. Soc. IV. 1847, p. 268, t.  
15, f. 4.  
S. Australia.
- 6327 *DIMIDIATUS* Baly, Trans. Ent. Soc. 1871, p. 389.  
N. Australia.

22 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

- 6328 *DISTINGUENDUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXIX.  
Australia.
- 6329 *DORIE* Chap. Ann. Mus. Gen. IX. p. 336.  
Cape York, N. Australia.
- 6330 *DUBOULAYI* Baly, Trans. Ent. Soc. 1871, p. 385.  
Champion Bay, W. Australia.
- 6331 *ELEGANTULUS* Baly, Ann. Nat. Hist. ser. 4, XX. p. 381.  
Australia.
- 6332 *FACIALIS* Baly, Journ. Linn. Soc. XIII. p. 466.  
S. Australia.
- 6333 *FASCIATUS* Baly, Trans. Ent. Soc. 1871, p. 390.  
Champion Bay, W. Australia.
- 6334 *FRONTALIS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXX.  
Australia.
- 6335 *FUGITIVUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXXII  
" " "

- 6342 **GODEFFROYI** Chap. Journ. Mus. Godeffr. XIV. p. 77.  
Peak Downs, Queensland.
- 6343 **HIRTICOLLIS** Baly, Trans. Ent. Soc. 1871, p. 384.  
W. Australia.
- 6344 **IMPERIALIS** Chap. Ann. Mus. Gen. IX. p. 335.  
Cape York, N. Australia.
- 6345 **JACOBYI** Baly, Ann. Nat. Hist. ser. 4, XX. p. 380.  
S. Australia.
- 6346 **JANSONI** Baly, Journ. Linn. Soc. XIII. p. 466.  
Rockhampton, Queensland.
- 6347 **LABIATUS** Chap. Ann. Soc. Ent. Belg. XVIII. Bull. p. LXXX.  
Australia.
- 6348 **LACORDAIREI** Chap. Ann. Soc. Ent. Belg. XVIII. Bull.  
p. LXXV.  
Australia.
- 6349 **LÆTUS** Baly, Journ. Linn. Soc. XIII. p. 464.  
S. Australia.
- 6350 **LÆVIGATUS** Baly, Ann. Nat. Hist. ser. 4, XX. p. 380.  
N. Australia.
- 6351 **LAMINATUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXIX.  
Australia.
- 6352 **LATERITIUS** Chap. Journ. Mus. Godeffr. XIV. p. 76.  
Gayndah, Queensland.
- 6353 **LENTULUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXXI.  
Australia, and Tasmania.
- 6354 **MACULICOLLIS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVI.  
Australia.
- 6355 **MACULIFRONS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVIII.  
Australia.
- 6356 **MAXILLOSUS** Suffr. Mon. XIII. p. 27.  
Victoria.

24 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6357 NITIDULOIDES Chap. Journ. Mus. Godeffr. XIV p. 76.  
Sydney, N. S. Wales.

6358 NOBILIS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXXI.  
Australia.

6359 O. SUBVANS Chap. Journ. Mus. Godeffr. XIV, p. 76.  
Gayndah, Queensland.

6360 OBLUSUS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVI.  
Australia.

6361 OCHRODUS Erichs. Wiegim. Arch. 1842, I. p. 233; Suffr.  
Mon. XIII. p. 40.  
Tasmania.

6362 ODOLWAINI Baly, Trans. Ent. Soc. Lond. 1871, p. 387.  
S. Australia.

6363 OPHTHALMICUS Suffr. Mon. XIII. p. 45.  
Australia.

6364 OPULENTUS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVII

- 6372 **PUBERULUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXV.  
Australia.
- 6373 **PUBICOLLIS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXV.  
Australia.
- 6374 **PULCHELLUS** Baly, Journ. Linn. Soc. XIII, p. 468.  
S. Australia.
- 6375 **PUNCTULUM** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXX.  
Australia.
- 6376 **PYRIFORMIS** Suffr. Mon. XIII. p. 45.  
Australia.
- 6377 **RUFESCENS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVI.  
Australia.
- 6378 **RUFICOLLIS** Saund. Trans. Ent. Soc. ser. 4, IV. 1847, p. 269.  
Tasmania.
- 6379 **RUFIPES** Saund. Trans. Ent. Soc. ser. 4, IV. 1847, p. 269.  
Tasmania.
- 6380 **RUFOCUPREUS** Baly, Trans. Ent. Soc. 1871, p. 386.  
Champion Bay, W. Australia.
- 6381 **SCHMELZI** Chap. Journ. Mus. Godeffr. XIV. p. 77.  
Peak Downs, Queensland.
- 6382 **SEMICIRCULARIS** Baly, Journ. Linn. Soc. XIII. p. 466.  
Australia.
- 6383 **SEMINULUM** Germ. Linn. Ent. III. p. 242 ; Suffr. Mon. XIII.  
p. 38.  
Adelaide, S. Australia.
- 6384 **SERENUS** Baly, Journ. Linn. Soc. XIII. p. 468.  
S. Australia.
- 6385 **SPLENDIDUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVIII.  
Australia.
- 6386 **STRIGOSUS** Baly, Trans. Ent. Soc. 1871, p. 385.  
Champion Bay, W. Australia.



26 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6387 SUBENEUS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXIX.  
Tasmania.

6388 SUBCYLINDRICUS Baly, Ann. Nat. Hist. ser. 4, XX. p. 385.  
W. Australia.

6389 SUBMETALLESCEUS Baly, Ann. Nat. Hist. ser. 4, XX. p. 383.  
Gawler, S. Australia.

6390 SUFFRIANI Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXVIII.  
Australia.

6391 TARSATUS Baly, Trans. Ent. Soc. 1871, p. 387.  
Crampton Bay, W. Australia.

6392 TILIALIS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXIX.  
Australia.

6393 TRABEATUS Chap. Journ. Mus. Godeffr. XIV. p. 76  
Peak Downs, Queensland.

6394 XANTHOSTOMUS Suffr. Mon. XIII. p. 36.  
Australia.

6400 GEMINUS Chap. Soc. Ent. Belg. XVIII. Bull. p. LXXXI.  
N. S. Wales, and S. Australia.

6401 MARGINICOLLIS Baly, Journ. Linn. Soc. XIII. p. 463.  
Swan River, W. Australia.

CADMUS. Erichson.

6402 ALTERNANS Chap. Soc. Ent. Belg. XVIII. Bull. p. ci.  
Australia.

6403 AMPLICOLLIS Chap. Journ. Mus. Godeffr. XIV. p. 78.  
Rockhampton, Queensland.

6404 ARROGANS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcix.  
Australia.

6405 AURANTIACUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcviu.  
Australia.

6406 AUSTRALIS Boisd. Voy. Astrol. Col. p. 584, t. 8, f. 15 ;  
Saund. Trans. Ent. Soc. IV. 1846, p. 202, t. 15, f. 2 ;  
Suffr. Mon. XIII. p. 52 ; Dej. Cat. 3 ed. p. 444.  
Australia and Tasmania.

6407 BIFASCIATUS Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 198,  
t. 15, f. 1.  
Australia.

6408 CANALICULATUS Chap. Soc. Ent. Belg. XVIII. Bull. p. c.  
Australia.

6409 CARIOSUS Chap. Ann. Mus. Gen. IX. p. 342.  
N. S. Wales.

6410 COGNATUS Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 201, ♀.  
*quadrituberculatus* Suffr. Mon. XIII. p. 66, ♂.  
Australia and Tasmania.

6411 COLOSSUS Chap. Soc. Ent. Belg. XVIII. Bull. p. c.  
Australia.

- 6413 *SAUND.* Trans. Ent. Soc. IV. ser.  
t. 15, f. 3.  
var. *Ewingi* Saund. l.c. p. 204.  
Australia, and Tasmania.
- 6414 EXCREMENTARIUS Suffr. Mon. XIII. p. 57.  
Australia.
- 6415 FERRUGINEUS Fairm. Ann. Fr. 1843, p. 14, t.  
Mon. XIII. p. 89.  
*foveicollis* Saund. Trans. Ent. Soc. IV. ser. 3  
Australia, and Tasmania.
- 6416 FLAVOCINCTUS Saund. Trans. Ent. Soc. IV.  
p. 200 ; Suffr. Mon. XIII. p. 78, ♂.  
*cinnamomeus* Suffr. Mon. XIII. p. 76, ♀.  
N. S. Wales.
- 6417 GIGAS Oliv. Ent. VI. p. 785, t. 4, f. 45.  
*bifasciatus* Saund. Trans. Ent. Soc. IV. ser. 3,  
t. 15, f. 1.  
Australia.
- 6418 HISTRIONYCUS Chap. Soc. Ent. Belg. XVIII. I  
Australia.
- 6419 KLUGI Saund. Trans. Ent. Soc. IV. ser. 3, 184  
Australia.
- 6420 LACERTINUS Chap. Journ. Mus. Godeffr. XIV.  
Rockhampton, Queensland.

- 6422 **LUCTUOSUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.
- 6423 **LUTATUS** Chap. Ann. Mus. Gen. IX. p. 342.  
N. S. Wales.
- 6424 **MACULICOLLIS** Chap. Soc. Ent. Belg. XVIII. Bull. p. ci.  
Australia.
- 6425 **MONOCHROUS** Boisd. Voy. Astrol. Col. p. 585, t. 8, f. 16 ;  
Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 201.  
Australia.
- 6426 **ORNATUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.
- 6427 **PACIFICUS** Suffr. Mon. XIII. p. 68.  
Australia.
- 6428 **PURPURASCENS** Chap. Soc. Ent. Belg. XVIII. Bull. p. ci.  
Australia.
- 6429 **QUADRIVITTATUS** Chap. Journ. Mus. Godeffr. XIV. p. 78.  
Rockhampton, Queensland.
- 6430 **RINGENS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xcix.  
Australia.
- 6431 **RUBIGINOSUS** Boisd. Voy. Astrol. Col. 1835, p. 587 ; W. S.  
Macleay, Dej. Cat. 3 ed. p. 444.  
*gigas* Suffr. Mon. XIII. p. 62.  
*rugicollis* Gray, Griff. Anim. Kingd. XV. p. 148, t. 67, f. 5 ;  
Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 201.  
N. S. Wales.
- 6432 **RUFESCENS** Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 207.  
Australia.
- 6433 **RUGOSUS** Suffr. Mon. XIII. p. 71 ; Dej. Cat. 3 ed. p. 444.  
Australia.
- 6434 **SALEBROSUS** Guér. Voy. Coquille, Ins. 1830, p. 143.  
Sydney, N. S. Wales.

30 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6435 SCULPTILIS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcix.  
Australia.

6436 SCUTATUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcix.  
Australia.

6437 SERICEUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.

6438 STRATIOTICUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcix.  
Australia.

6439 STRIGILLATUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.

6440 TASMANICUS Saund. Trans. Ent. Soc. IV. ser. 3, 1846, p. 205.  
Tasmania.

6441 TROSPILUS Chap. Soc. Ent. Belg. XVIII. Bull. p. ci.  
Australia.

6442 VERRUCOSUS Chap. Journ. Mus. Godeffr. XIV. p. 79.  
Cavendish, Queensland.

- 6448 *ÆGER* Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.
- 6449 *ALBILINEA* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 145 ;  
Suffr. Mon. XIII. p. 104.  
*marginicollis* Saund. l.c. p. 145, ♀.  
Australia, and Tasmania.
- 6450 *ANTENNALIS* Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.
- 6451 *APICALIS* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 154.  
Tasmania.
- 6452 *ARGENTATUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. xcii.  
Australia.
- 6453 *ATER* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 145.  
Tasmania.
- 6454 *ATTENUATUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.
- 6455 *AUSTRALIS* Saund. Proc. Ent. Soc. 1841, p. 56 ; Trans. Ent.  
Soc. IV. 2, 1845, p. 152, t. 9, f. 6.  
Swan River, W. Australia.
- 6456 *BELLA* Baly, Trans. Ent. Soc. Lond. 1877, p. 225 (*Idioccephala*).  
Cape York, N. Australia.
- 6457 *BELLICOSUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. xcv.  
Australia.
- 6458 *BIHAMATUS* Chap. Soc. Ent. Belg. XVIII. Bull. p. xciv.  
Australia.
- 6459 *BYNOEI* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 146.  
Australia.
- 6460 *CARNIFEX* Suffr. Mon. XIII. p. 93.  
Australia.
- 6461 *CASTUS* Suffr. Mon. XIII. p. 120.  
W. Australia.

32 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6462 CHAPUISI Baly, Trans. Ent. Soc. Lond. 1877, p. 224,  
(Iucocephala).

Rockhampton, Queensland.

6463 CHRYSOMELINUS Chap. Soc. Ent. Belg. XVIII. Bull. p. xc.  
Australia.

6464 CLAVICORNIS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcvi.  
Australia.

6465 CONSORIS Boisd. Voy. Astrol. Col. p. 588, t. 8, f. 17; Suffr.  
Mon. XIII. p. 101.

Roos. Saund. Trans. Ent. Soc. IV. 2, 1845, p. 143.

Australia, (Swan River, &c.)

6466 CONVEXICOLLIS Chap. Soc. Ent. Belg. XVIII. Bull. p. xci.  
Australia.

6467 CRASSICORNIS Chap. Soc. Ent. Belg. XVIII. Bull. p. xcv.  
Australia.

6468 CYANIPENNIS Saund. Trans. Ent. Soc. IV. 2, 1845, p. 144

- 6475 **EUMOLPHUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xc.  
Australia.
- 6476 **FASCIALIS** Chap. Journ. Mus. Godeffr. XIV. p. 78.  
Gayndah, Queensland.
- 6477 **GRACILIOR** Chap. Soc. Ent. Belg. XVIII. Bull. p. xci.  
Australia.
- 6478 **HÆMATODES** Boisd. Voy. Astrol. Col. p. 586 ; Saund. Trans.  
Ent. Soc. IV. 2, 1845, p. 142. t. 9, f. 1 ; Suffr. Mon.  
XIII. p. 151. (Dicenopsis).
- 6479 **HISPIDUS** Chap. Journ. Mus. Godeffr. XIV. p. 72.  
Gayndah, Queensland.
- 6480 **IRIDIPENNIS** Chap. Ann. Mus. Gen. IX. p. 344.  
Australia.
- 6481 **JOCOSUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xcv.  
Australia.
- 6482 **JACKSONI** Guér. Voy. Coquille, Ins. 1830, p. 143.  
Port Jackson, N. S. Wales.
- 6483 **LÆVICOLLIS** Gebler, Ledeb. Reis. II. 3, 1830, p. 205.  
var. *arennensis* Weise, Naturg. d. Insect. Deutsch. VI. 1,  
p. 159.  
Australia.
- 6484 **MELANOCEPHALUS** Saund. Proc. Ent. Soc. 1841, p. 57 ; Trans.  
Ent. Soc. IV. 2, 1845, p. 153 ; Suffr Mon. XIII. p. 107  
(Ochrosopsis).  
Australia.
- 6485 **NIGRIPENNIS** Baly, Journ. Linn. Soc. XIII. p. 459 (Idioce-  
phala).  
Rockhampton, Queensland.
- 6486 **PARENTHETICUS** Suffr. Mon. XIII. p. 96.  
Australia.
- 6487 **PERLONGUS** Chap. Soc. Ent. Belg. XVIII. Bull. p. xciv.  
Australia and Tasmania.



- 6490 *rugifrons* Chap. Soc. Ent. Belg. XVIII. B  
Australia and Tasmania.
- 6491 *rugifrons* Chap. Soc. Ent. Belg. XVIII. B  
Australia.
- 6492 *scabrosus* Oliv. Ent. VI. p. 807, t. 5, f.  
XIII. p. 112.  
*rugosus* Saund. Trans. Ent. Soc. IV. 2  
(Idiocephala).  
N. S. Wales.
- 6493 *similis* Saund. Trans. Ent. Soc. IV. 2, 1845  
Mon. XIII. p. 115, (Idiocephala).  
N. S. Wales.
- 6494 *speciosus* Guér. Voy. Coquille, Ins. 1830, p.  
48, f. 7 ; Boisd. Voy. Astrol. Col. p. 5  
Dej. Cat. 3 ed. p. 444, (Physicerus).  
Australia.
- 6495 *sticticus* Suffr. Mon. XIII. p. 109.  
N. S. Wales.
- 6496 *subfasciatus* Saund. Trans. Ent. Soc. IV. 2  
(Idiocephala).  
Australia.
- 6497 *terminalis* Chap. Journ. Mus. Godeffr. XIV  
Gayndah, Queensland.
- 6498 *vermicularis* Saund. Proc. Ent. Soc. 1841  
Ent. Soc. IV. 2, 1845, p. 150, f. 1.

- 6500 *VIRIDIS* Saund. Trans. Ent. Soc. IV. 5, 1847, p. 294, t. 15,  
f. 6 ; Suffr. Mon. XIII. p. 166.  
N. S. Wales.

PARACEPHALA. Baly.

- 6501 *FILUM* Chap. Soc. Ent. XVIII. Bull. p. xcv.  
Australia.
- 6502 *PECTORALIS* Baly, Trans. Ent. Soc. 1877, p. 223.  
Cape York, N. Australia.

MITOCERA. Saunders.

- 6503 *TRICOLOR* Fabr. Syst. El. II. 1801, p. 51.  
N. S. Wales.
- 6504 *VIRIDIPENNIS* Saund. Proc. Ent. Soc. 1841, p. 54 ; Trans.  
Ent. Soc. 1845, p. 151, t. 9. f. 5 ; Suffr. Mon. XIII,  
p. 157.  
Swan River, W. Australia.

EUPHYMA. Baly.

- 6505 *ELEGANS* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 143, t. 9,  
f. 2 ; Suffr. Mon. XIII. p. 103 (*Idiocephala*) ; Baly.  
Trans. Ent. Soc. Lond. 1877, p. 224.  
*axillaris* Sturm. Cat. 1843, p. 304.  
N. S. Wales.
- 6506 *FLAVIVENTRIS* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 147 ;  
Suffr. Mon. XIII. p. 123 (*Idiocephala*) ; Baly, Trans.  
Ent. Soc. Lond. 1877, p. 224.  
N. S. Wales.

APOROCERA. Saunders.

- 6507 *APICALIS* Saund. Proc. Ent. Soc. 1841, p. 53 ; Trans. Ent.  
Soc. IV. 2, p. 150, t. 9, f. 4.  
N. S. Wales.
- 6508 *BICOLOR* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 149, t. 9,  
f. 3.  
N. S. Wales.

- 6511 ANTENNATUS Baly, Journ. Linn. Soc. XIII. 1  
N. W. Australia.
- 6512 CICATRICOSUS Chap. Soc. Ent. Belg. XVIII.  
Australia.
- 6513 GRACILICORNIS Baly, Journ. Linn. Soc. XIII  
N. W. Australia.
- 6514 PRETIOSUS Baly, Trans. Ent. Soc. Lond. 1877  
Australia.
- 6515 SARTOR Suffr. Mon. Linn. Ent. XIII. 1859, 1  
Australia.
- 6516 SAUNDERSI Chap. Soc. Ent. Belg. XVIII. Bull  
Australia.
- 6517 SULPHURIPENNIS Baly, Journ. Linn. Soc. XII  
S. Australia.
- 6518 SUTOR Suffr. Mon. Linn. Ent. XIII. 1859, 1  
Australia.

SCHIZOSTERNUS. Chapuis.

- 6519 ALBOGULARIS Chap. Soc. Ent. Belg. XVIII. B  
Australia.
- 6520 COCCINEUS Chap. Journ. Mus. Godeffr. XIV.  
Gayndah, Queensland.

- 6522 *ÆREUS* Suffr. Mon. Linn. Ent. XIII. 1859, p. 131 ; Sturm.  
Cat. 1843, p. 304.  
Australia.
- 6523 *ATRAMENTARIUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xli.  
Australia.
- 6524 *AURICULATUS* Suffr. Mon. Linn. Ent. XIII. 1859, p. 129.  
Australia.
- 6525 *CHALCEUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xl.  
Australia.
- 6526 *CHALYBEUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xliii.  
Australia.
- 6527 *COLLARIS* Chap. Soc. Ent. Belg. XIX. Bull. p. xxxix.  
Australia.
- 6528 *CONJUGATUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xxxix.  
Australia.
- 6529 *CORRUSCUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xl.  
Australia.
- 6530 *CRASSICOSTATUS* Chap. Soc. Ent. Belg. XIX. Bull. p. xliii.  
Australia.
- 6531 *DÆMONIACUS* Suffr. Mon. Linn. Ent. XIII. 1859, p. 129.  
Australia.
- 6532 *DARWINI* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 148.  
*subbrunneus* Saund. l.c. p. 148 (*Idiocephala*).  
N. S. Wales.
- 6533 *DIFFICILIS* Chap. Soc. Ent. Belg. XIX. Bull. p. xxxix.  
Australia.
- 6534 *ERYTHROTIS* Chap. Soc. Ent. Belg. XIX. Bull. p. xxxviii.  
Australia.
- 6535 *GENIALIS* Chap. Soc. Ent. Belg. XIX. Bull. p. xlii.  
Australia.

- 6539 **LÆVIUSCULUS** Chap. Soc. Ent. Belg. XIX. Bull.  
Australia.
- 6540 **LIBERTINUS** Suffr. Mon. Linn. Ent. XIII. 185  
Australia.
- 6541 **METALLICUS** Chap. Soc. Ent. Belg. XIX. Bull.  
Australia.
- 6542 **NIGRITUS** Chap. Soc. Ent. Belg. XIX. Bull. p.  
Australia.
- 6543 **OBTUSUS** Chap. Soc. Ent. Belg. XIX. Bull. p.  
Australia.
- 6544 **PAUPERCULUS** Germ. Linn. Ent. III. p.  
Mon. XIII. p. 135.  
S. Australia.
- 6545 **PAUXILLUS** Chap. Soc. Ent. Belg. XIX. Bull. p.  
Australia.
- 6546 **PICEITARSIS** Chap. Soc. Ent. Belg. XIX. Bull. p.  
Australia.
- 6547 **PLAGICOLLIS** Chap. Soc. Ent. Belg. XIX. Bull. p.  
Australia.
- 6548 **PLAGINOTUS** Chap. Journ. Mus. Godeffr. XIV.  
Rockhampton, Queensland.
- 6549 **PECTORALIS** Chap. Journ. Mus. Godeffr. XIV. p.  
Rockhampton, Queensland

6551 *RUFESCENS* Bohem. Res. Eugen. p. 161 ; Suffr. Mon. XIII.  
p. 137.  
N. S. Wales.

6552 *SEMICOSTATUS* Chap. Soc. Ent. Belg. XIX. Bull. p. XLIII.  
Australia.

6553 *STURMI* Chap. Soc. Ent. Belg. XIX. Bull. p. XXXVII.  
Australia.

6554 *SUBVIRENS* Chap. Soc. Ent. Belg. XIX. Bull. p. XLII.  
Australia.

6555 *TASMANICUS* Saund. Trans. Ent. Soc. IV. 2, 1845, p. 148  
(*Idiocephala*)  
Tasmania.

6556 *VERTICALIS* Chap. Soc. Ent. Belg. XIX. Bull. p. XXXVIII.  
Australia.

*DIANDICHUS*. Chapuis.

6557 *ANALIS* Chap. Gen. Col. X. 1874, p. 165.  
Australia

Sub-Family. *EUMOLPIDES*.

*NODA*. Chapuis.

6558 *PROXIMA* Bohem. Res. Eugen. 1860, p. 164.  
N. S. Wales.

6559 *TASMANICA* Jac. Proc. Zool. Soc. 1879, p. 777.  
Tasmania.

*ALITTUS*. Chapuis.

6560 *FOVEOLATUS* Chap. Gen. Col. X. 1874, p. 243, note 2.  
Port Denison, Queensland.

*TERILLUS*. Chapuis.

6561 *DUBOULAYI* Baly, Journ. Linn. Soc. Zool. XIII. p. 471.  
W. Australia.

6562 *FOVEOLATUS* Baly, Journ. Linn. Soc. Zool. XIII. p. 469.  
W. Australia.

W. Australia.

- 6567 VITTATUS Baly, Journ. Linn. Soc. Zool. XII  
Rockhampton, Queensland.

COLASPIS. Fabricius.

- 6568 SEMISTRIATA Oliv. Ent. VI. p. 890, t. 2, f. 25  
Australia.

- 6569 STRIATOPUNCTATA Boisd. Voy. Astrol. Col. 1  
Australia.

AGETINUS. Chapuis.

- 6570 AUSTRALIS Boisd. Voy. Astrol. Col. p. 583 (  
Rev. et Mag. de Zool. 1876, p. 295.  
Australia.

- 6571 CORINTHUS Boisd. Voy. Astrol. Col. p. 582 (C  
Rev. et Mag. de Zool. 1876, p. 295.  
*Geloptera geniculata* Baly, Journ. of Ent. I.  
Australia.

- 6572 JUGULARIS Erichs. Wieg. Arch. 1842, p. 23  
Lef. Rev. et Mag. de Zool. 1876, p. 295.  
Tasmania.

- 6573 SUBCOSTATUS Chap. Gen. Col. X. 1874, p.  
(Agetus).  
Adelaide, S. Australia.

HYPODERES. Lefèvre.

- 6574 DENTICOLLIS Lef. Ann. Soc. Ent. Fr. 1877, p.  
*Geloptera vestita* D. ' ~

GELOPTERA. Baly.

- 6575 ALBERTISI Jac. Ann. Mus. Civ. Gen. XX. 1884, p. 277.  
Cape York, N. Australia.
- 6576 DUBOULAYI Clark, Trans. Ent. Soc. Lond. 1865, p. 417.  
Champion Bay, W. Australia.
- 6577 IGNEONITENS Baly, Journ. Linn. Soc. Zool. XIII. p. 472.  
W. Australia.
- 6578 NODOSA Clark, Trans. Ent. Soc. Lond. 1865, p. 418.  
Champion Bay, W. Australia.
- 6579 TUBERCULATA Baly, Journ. of Ent. I. 1861, p. 284.  
Adelaide, S. Australia.

DERMORHYTIS. Baly.

- 6580 FEMORALIS Jac. Ann. Mus. Civ. Gen. XX., 1884, p. 229.  
Australia.

SPILOPYRA. Baly.

- 6581 SUMPTUOSA Baly, Journ. of Ent. I. 1860, p. 25, t. 1, f. 3.  
N. S. Wales, and Queensland.

TOMYRIS. Chapuis.

- 6582 ELEGANTULA Lef. Mém. Soc. Liège, XI. Cat. Eumolp. p. 64.  
Tasmania.
- 6583 PROXIMA Erichs. Wieg. Arch. 1842, p. 233 (*Odontionopa*) ;  
Lef. Rev. Mag. Zool. 1876, p. 302.  
Tasmania.
- 6584 PULCHELLA Chap. Gen. Col. X. 1874, p. 266, note 1,  
t. CXIX. f. 2.  
N. S. Wales (Sydney).
- 6585 PUSILLA Lef. Mém. Soc. Liège, XI. Cat. Eumolp. p. 64.  
King George's Sound, W. Australia.
- 6586 VIRIDULA Erichs. Wieg. Arch. 1842, p. 232 (*Odontionopa*) ;  
Lef. Rev. Mag. Zool. 1876, p. 302.  
Tasmania.



SOELODONTA. Westwood.

- 6587 SIMONI Baly, Journ. Linn. Soc. 1877, p. 251.  
Rockhampton, Queensland.

RHYPARIDA. Baly.

- 6588 APICALIS Jac. Ann. Mus. Civ. Gen. XX. 1884, p. 207.  
Cape York, N. Australia.
- 6589 BASALIS Baly, Trans. Ent. Soc. Lond. 1867, p. 168  
Cape York, N. Australia.
- 6590 CLATEATA Jac. Ann. Mus. Civ. Gen. XX. 1884, p. 204  
Cape York, N. Australia.
- 6591 DIDYMA Fabr. Syst. Ent. p. 107 ; Don, Epit. Ins. N. Holl.  
1805, t. II. ; Oliv. Ent. VI. p. 789, t. 4, f. 51 ; Clark,  
Journ. of Ent. II. 1864, p. 252.  
var. *fulvoplagiata* Jac. Ann. Mus. Civ. Gen. XX, p. 210.  
Cape York, N. Australia.

6599 NIGROCYANEA Clark, Journ. of Ent. II. 1864, p. 258 (Marseus).

N. S. Wales.

6600 NITIDA Clark, Journ. of Ent. II. 1864, p. 252.

N. S. Wales.

6601 RUFA Clark, Journ. of Ent. II. 1864, p. 253 (Marseus).

N. S. Wales.

6602 RUFIGOLLIS Clark, Journ. of Ent. II. 1864, p. 254 (Marseus).

N. S. Wales.

6603 RUFOFLAVA Clark, Journ. of Ent. II. 1864, p. 255 (Marseus).

Australia.

6604 VITTATA Blanch. Voy. Pôle Sud, IV. p. 327, t. XIX. f. 4 (Marseus); Clark, Journ. of Ent. II. 1864, p. 252.

Northern Queensland.

EUMOLPHUS. Weber.

6605 VIRIDIÆNEUS Blanch. Voy. Pôle Sud, IV. Zool. p. 327, t. XIX. f. 5.

Raffle's Bay, N. Australia.

COLASPOSOMA. Castelnau.

6606 SELLATUM Baly, Journ. Linn. Soc. XIV. 1877, p. 254.

*barbatum* Har. Col. Heft. XVI. 1879, p. 229; Jac. Proc. Zool. Soc. 1881, p. 446.

W. Australia, and Queensland.

THAUMASTOMERUS. Clark.

6607 VIRIDIS Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865, p. 419.

Champion Bay, W. Australia.

OCNIDA. Lefèvre.

6608 PALLIDA Baly, Journ. Linn. Soc. XIV. 1877, p. 254 (Ocnus); Lef. Mém. Soc. Liège, XI. Cat. Eumolph. p. 111.

W. Australia.

- 6611 *CHRYSTURA* Germ. Linn. Ent. III. 1848, p. 2  
Adelaide, S. Australia.
- 6612 *EVANESCENS* Bohem. Res. Eugen. p. 167.  
Sydney, N. S. Wales.
- 6613 *HISPIDULA* Clark, Trans. Ent. Soc. Lond.  
p. 420.  
Champion Bay, W. Australia.
- 6614 *MUTICA* Germ. Linn. Ent. III. 1848, p. 240  
Adelaide, S. Australia.
- 6615 *NIGRO-ÆNEA* Clark, Trans. Ent. Soc. Lond. :  
p. 420.  
Champion Bay, W. Australia.
- 6616 *PUBERULA* Bohem. Res. Eugen. p. 167 ; Cha  
p. 309 (*Edusina*).  
Sydney, N. S. Wales.
- 6617 *SETOSA* Clark, Trans. Ent. Soc. Lond. ser.  
p. 419.  
Champion Bay, W. Australia.
- 6618 *SUAVEOLA* Germ. Linn. Ent. III. 1848, p. 240  
Adelaide, S. Australia.
- 6619 *SUTURALIS* Chap. Gen. Col. X. p. 309. nota 1

6621 VIRIDICOLLIS Lef. Rev. Mag. Zool. 1875, p. 131.  
Australia.

6622 VIRIDIPENNIS Bohem. Res. Eugen. p. 167.  
Sydney, N. S. Wales.

CLEPTOR. Lefèvre.

6623 INERMIS Lef. Mém. Soc. Liége, XI. Cat. Eumolp. p. 115.  
Queensland.

6624 RUFIMANUS Lef. Mém. Soc. Liége, XI. Cat. Eumolp. p. 115.  
Port Denison, Queensland.

NEOCLES. Chapuis.

6625 SULCICOLLIS Chap. Gen. Col. X. 1874, p. 231, note 1.  
Sydney, N. S. Wales.

TYPOPHORUS. Erichson.

6626 AUSTRALIS Bohem. Res. Eugen. p. 162.  
Sydney, N. S. Wales.

EURYDEMUS. Chapuis.

6627 GRANDIS Baly, Journ. of Ent. I. 1861, p. 287 (Rhyparida);  
Journ. Linn. Soc. Zool. XIV. 1877, p. 259.  
*insignis* Chap. Gen. Col. X. 1874, p. 334; Lef. Mém. Soc.  
Liége, XI. Cat. Eumolp. p. 156.  
Australia.

CLEORINA. Lefèvre.

6628 PULCHELLA Lef. Mém. Soc. Liége, XI. Cat. Eumolp. p. 145.  
Cooktown, N. Queensland.

COLASPOIDES. Castelnau.

6629 AUSTRALIS Jac. Proc. Zool. Soc. Lond. 1879, p. 780.  
Queensland.

6630 SIMPLICIPENNIS Jac. Ann. Mus. Civ. Gen. 1885, p. 20.  
Australia.

STRUMATOPHYMA. Baly

- 6650 UNDEFLATIPENNIS Clark, Trans. Ent. Soc. Lond. ser 3, II.  
1865, p. 415 (Chalcolampra); Baly, Trans. Ent. Soc.  
1871, p. 400.  
Swan River, W. Australia.
- 6651 VERRUCOSA Clark, Journ. of Ent. II 1864, p. 250, t. 12,  
f. 2 (Chalcolampra).  
N. Australia.

PHYLLOCHARIS. Dalman.

- 6652 ACHOLPUCA Baly, Journ. of Ent. 1862, p. 291.  
Moreton Bay, Queensland.
- 6653 CYANICORNIS Fabr. Syst. Ent. p. 99; Oliv. Ent. V. p. 541,  
t. 4, f. 46; Dalm. Ephem. ent. p. 21; Baly, Trans.  
Ent. Soc. Lond. n. ser. III. 5, 1855, p. 171.  
var. *Klugi* W. S. Macleay, King's Surv. Austral. II. 1827,  
n. 453. Boeckl. Voy. Austral. II. p. 571. Boeckl. Voy.

6657 *IMPRESSICOLLIS* Jac. Ann. Mus. Civ. Gen. ser. 2, II. 1885,  
p. 24.  
Australia.

6658 *JANSONI* Baly, Ann. Nat. Hist. ser. 5, I. 1878, p. 39.  
Australia.

6659 *LEOPARDA* Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855,  
p. 173.  
Moreton Bay, Queensland.

6660 *MELANOSPILA* Baly, Journ. of Ent. I. 1862, p. 290.  
Moreton Bay, Queensland.

6661 *NIGRICORNIS*. Fabr. Syst. Ent. p. 98 ; Donovan. Epit. Ins. N.  
Holl. t. 2 ; Oliv. Ent. V. p. 540, t. 4, f. 43 ; Baly, Trans  
Ent. Soc. n. ser. III. p. 175.  
Australia.

6662 *ORNATA* Baly, Journ. of Ent. I. 1862, p. 290.  
Moreton Bay, Queensland.

. *DIPHYLLOCERA*. Westwood.

6663 *GEMELLATA* Westw. Trans. Ent. Soc. Lond. ser. I, V. p. 214,  
t. 22, f. 1 ; Baly, Trans. Ent. Soc. Lond. n. ser. III.  
1855, p. 176.  
N. S. Wales, and Queensland.

6664 *STRIATA* C. O. Waterh. Trans. Ent. Soc. Lond. 1875, p. 206.  
Port Bowen, Queensland.

*CHALCOLAMPRA*. Blanchard.

6665 *ÆNEA* Boisd. Voy. Astrol. Col. 1835, p. 576 ; Dej. Cat. 3 ed.  
p. 419.  
*acervata* Germ. Linn. Ent. III. 1848, p. 238 ; Baly, Trans.  
Ent. Soc. Lond. n. ser. III. 1855, p. 184.  
*convexa* Blanch. Voy. Pôle Sud, IV. Zool. p. 329, t. 19, f. 6.  
Australia, and Tasmania.

6666 *CHALYBEATA* Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855,  
p. 185.  
Adelaide, S. Australia.

50 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

- 6667 *CONSTRICTA* Erichs. Wieg. Arch. 1842, I. p. 230; Baly,  
Trans. Ent. Soc. Lond. n. ser. III. 1855, p. 182.  
*strigipennis* White, Stoke's Voy. App. 1846, p. 512, t. 2,  
f. 9  
Victoria, and Tasmania.
- 6668 *LATICOLLIS* Clark, Trans. Ent. Soc. ser. 3, II. 1865, p. 416.  
Champion Bay, W. Australia.
- 6669 *LUTEICORNIS* Erichs. Wieg. Arch. 1842, I. p. 231.  
Tasmania.
- 6670 *MARMORATA* Baly, Ann. Nat. Hist. ser. 3, XV. 1865, p. 35.  
Moreton Bay, Queensland.
- 6671 *OCTODECAIMGUTTATA* Fabr. Syst. Ent. p. 100; Donovan. Epit.  
Ins. N. Holl. t. 2; Boisd. Voy. Astrol. Col. p. 375;  
Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855, p. 186;  
Phytoph. p. 281.  
Australia.

- 6678 **THORACICA** Baly, Trans. Ent. Soc. Lond. n. ser. III. p. 183,  
t. 14, f. 4.  
Adelaide, S. Australia.

**EULINA.** Baly.

- 6679 **CURTISI** Baly, Trans. Ent. Soc. Lond. n. ser. III. 1854,  
p. 180, t. 14, f. 3.  
N. S. Wales.

**LAMPROLINA.** Baly.

- 6680 **ÆNEIPENNIS** Boisd. Voy. Astrol. Col. p. 574 ; Baly, Trans.  
Ent. Soc. Lond. n. ser. III. 1855, p. 177 ; Dej. Cat.  
3 ed. p. 419.  
N. S. Wales.

- 6681 **DISCOIDALIS** Baly, Ann. Nat. Hist. ser. 3. XV. 1865, p. 34.  
Moreton Bay, Queensland.

- 6682 **GRANDIS** Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855,  
p. 178.  
N. S. Wales.

- 6683 **IMPRESSICOLLIS** Baly, Cist. Ent. II. p. 49.  
Rockhampton, Queensland.

- 6684 **JANSONI** Baly, Cist. Ent. II. p. 48.  
Rockhampton, Queensland.

- 6685 **PERPLEXA** Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855,  
p. 261.  
Richmond River, N. S. Wales.

- 6686 **PUNCTICOLLIS** Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855.  
p. 179.  
Richmond River, N. S. Wales.

- 6687 **SIMILLIMA** Baly, Trans. Ent. Soc. Lond. n. ser. III. 1855,  
p. 178.  
Australia.

- 6688 **UNICOLOR** Jac. Ent. Month. Mag. 1885, XXI p. 225.  
Australia.



PARALEPTA. Baly.

- 6689 FOVEICOLLIS Baly, Journ Linn. Soc. Lond. 1878, XIII.  
p. 475  
N. S. Wales

CALOMELA. Hope.

- 6690 AENEOTIDENS Clark, Trans. Ent. Soc. ser. 3, II. 1865, p. 416  
(Australica).  
Champion Bay, W. Australia.
- 6691 BARTONI Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856.  
p. 245 (Australica).  
Victoria
- 6692 CINGULATA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 245 (Australica).  
W. Australia.
- 6693 CIRCUMFUSA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 251 (Australica).

*pulchella* Dej. Cat. 3 ed. p. 426.

var. *punctipes* Germ. Linn. Ent. III. 1848, p. 236.

S. Australia and Victoria.

6698 DIGGLESII Baly, Ann. Nat. Hist. ser. 3, XV. 1865, p. 34.  
(Australica).

Moreton Bay, &c., Queensland.

6699 ERUDITA Baly, Ann. Nat. Hist. ser. 3, X. 1862, p. 24.  
(Australica).

Dawson River, Queensland.

6700 GENICULATA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 246 (Australica).

N. Australia.

6701 INTERRUPTOFASCIATA Baly, Trans. Ent. Soc. Lond. ser. 3, I.  
1863, p. 620, (Australica).

6702 IOPTERA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 246, (Australica).

S. Australia.

6703 MACLEAYI Boisd. Voy. Astrol. Col. p. 577, (Chrysomela);  
Gerstäck. Wieg. Arch. 1857, I. p. 372; Dej. Cat.  
3 ed. p. 426.

Australia.

6704 MACULICOLLIS Boisd. Voy. Astrol. Col. p. 577, (Chrysomela);  
Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856, p. 246,  
(Australica); Motsch. Schrenck. Reis. II. 1860, p. 217;  
d'Urville, Dej. Cat. 3 ed. p. 426.

Victoria.

6705 NITIDIPENNIS Boisd. Voy. Astrol. Col. p. 579, (Chrysomela);  
Dej. Cat. 3 ed. p. 426.

Australia.

6706 PALLIDA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 248, (Australica).

Australia.

54 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6707 PAROPSOIDES Clark, Journ. of Ent. II. 1864, p. 251,  
(Australica).

N. S. Wales.

6708 PELCHERIA Baly, Trans. Ent. Soc. n. ser. III. 1856, p. 250,  
(Australica).

N. S. Wales.

6709 PYRHOCEPHALA Clark, Journ. of Ent. II. 1864, p. 251,  
(Australica).

Australia.

6710 RUFEBES Boisd. Voy. Astrol. Col. 1835, p. 578, (Chrysomela); Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856, p. 217, (Australica), Motsch. Schrenck. Reis. II. 1860, p. 201, W. S. Macleay, Dej. Cat. 3 ed. p. 426.

Moreton Bay, Queensland.

6711 SAPPHIRUS Fabr. Syst. El. I. p. 432; Boisd. Voy. Astrol. Col. p. 579, (Chrysomela).

*sapphirina* Scholtz. Dej. Cat. 3 ed. p. 426.

STETHOMELA. Baly.

- 6718 CORNUTA Baly, Cist. Ent. II. p. 50.  
Queensland.
- 6719 FRATERNALIS Baly, Cist. Ent. II. p. 49.  
Queensland.
- 6720 FULVICOLLIS Jac. Ann. Mus. Civ. Gen. ser. 2, II. 1885,  
p. 27.  
Australia.
- 6721 LIMBATA Baly, Cist. Ent. II. p. 50.  
Australia.
- 6722 PARRYI Baly, Trans. Ent. Soc. Lond. ser. 3, II. 1864, p. 227.  
Australia.
- 6723 POROPTERA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 253.  
Richmond River, N. S. Wales.
- 6724 PRASINA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 252.  
Australia.
- 6725 SUBMETALLICA Baly, Trans. Ent. Soc. Lond. n. ser. III.  
p. 252.  
Moreton Bay, Queensland.

AUGOMELA. Baly.

- 6726 ELEGANS Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 256.  
Clarence River, N. S. Wales.
- 6727 HYPOCHALCEA Germ. Linn. Ent. III. 1848, p. 236, (Chrysomela) ; Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 255.  
Adelaide, S. Australia ; Richmond River, N. S. Wales.
- 6728 IBIDEA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856, p. 254.  
Moreton Bay, Queensland.

56 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6729 ORNATA Baly, Trans. Ent. Soc. Lond. n. ser. V. 1859, p. 156.  
Moreton Bay, Queensland.

6730 PRETIOSA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 256  
Adelaide, S. Australia.

6731 PYROPTERA Baly, Trans. Ent. Soc. Lond. n. ser. III. 1856,  
p. 254  
Richmond River, N. S. Wales.

PAROPSIS. Olivier.

6732 ABDOMINALIS Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 71.  
Murrumbidgee, N. S. Wales.

6733 ACICULATA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 68.  
Australia.

6734 AEGGIA Boisd. Voy. Astrol. Col. 1835, p. 563.  
Australia.

6735 AEGGIA Boisd. Voy. Astrol. Col. 1835, p. 563.

- 6743 *AMCENA* Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865, p. 405.  
Champion Bay, W. Australia.
- 6744 *AMABILIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
Queensland.
- 6745 *AMCENUA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
Australia.
- 6746 *ANXIA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
King George's Sound, W. Australia.
- 6747 *APICATA* Clark. Trans. Ent. Soc. Lond. ser. 3, II. 1865,  
p. 405.  
W. Australia.
- 6748 *ARCULA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 90.  
Australia.
- 6749 *ASPERA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 91.  
Sydney, N. S. Wales ; Port Denison, Queensland.
- 6750 *ASPERULA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 95.  
Rockhampton, Queensland.
- 6751 *ATOMARIA* Oliv. Ent. V. 1807, p. 598, t. 1, f. 1, a-b.  
Australia.
- 6752 *ATOMARIA* Marsh. Trans. Linn. Soc. IX. 1808, p. 286, t. 24,  
f. 3. ; Boisd. Voy. Astrol. Col. p. 562 ; Baly, Journ. of  
Ent. II. 1864. p. 300.  
Australia.
- 6753 *ATROPUS* Stal, Diagn. 1860, p. 465.  
Australia.
- 6754 *AUSTRALASIÆ* Fabr. Syst. El. I. p. 426 ; Oliv. Ent. V.  
p. 603, t. 1, f. 11.  
Australia.
- 6755 *BASALIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 76.  
Sydney, N. S. Wales.
- 6756 *BASICOLLIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 88.  
Sydney, Clarence River, &c., N. S. Wales.

58 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6757 BEATA Newm. The Entomol. 1842, p. 414.  
Victoria.

6758 BIPLAGIATA Bohem. Res. Eugen. p. 173.  
Sydney, N. S. Wales.

6759 BIPUNCTICOLLIS Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 70.  
Australia.

6760 BIMACULATA Oliv. Ent. V. p. 600, t. 1, f. 6.  
Australia.

6761 BRUNNEA Marsh. Trans. Linn. Soc. IX, 1808, p. 291, t. 25,  
f. 3.  
Australia.

6762 CALIGINOSA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 92.  
Port Denison, Queensland.

6763 CANCELLATA Chap. Ann. Soc. Ent. Belg. 1877, p. 95.  
Brisbane, Queensland.

6764 CAPTIORE Clark Trans. Ent. Soc. Lond. ser. 3. 11. 1865.

- 6771 *CHLOROTICA* Oliv. Ent. V. p. 604, t. 1, f. 13.  
Australia.
- 6772 *CIRCE* Stal, Diagn. 1860, p. 464.  
Moreton Bay, Queensland.
- 6773 *CIRCUMDATA* Newm. The Entomol. 1842, p. 415.  
Victoria.
- 6774 *CITRINA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 79.  
Sydney, N. S. Wales.
- 6775 *CLOELIA* Stal, Diagn. 1860, p. 464.  
Australia.
- 6776 *CLOTHO* Stal, Diagn. 1860, p. 464.  
Australia.
- 6777 *COADNUTA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 86.  
Sydney, N. S. Wales.
- 6778 *COCCINELLOIDES* Oliv. Ent. V. p. 601, t. 1, f. 7.  
Australia.
- 6779 *COMPLEXA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 74.  
Eclipse Island, N. E. Australia.
- 6780 *CONFERTA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 81.  
Adelaide, S. Australia.
- 6781 *CONJUGATA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 75.  
Adelaide, S. Australia.
- 6782 *CONSIMILIS* Baly, Journ. of Ent. II. 1864, p. 306.  
Adelaide, S. Australia.
- 6783 *CONTRACTA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 70.  
Rockhampton, Queensland.
- 6784 *CONVEXICOLLIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 93.  
Paroo River.
- 6785 *CORIARIA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 92.  
Melbourne, Victoria.



60 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

- 6786 CORRUGATA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 96.  
Sydney, N. S. Wales.
- 6787 COSTIPENNIS Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 96.  
Sydney, N. S. Wales.
- 6788 CROCATA Boisd. Voy. Astrol. Col. p. 564.  
Australia.
- 6789 DENTIS Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 80.  
King George's Sound, W. Australia.
- 6790 DECOLORATA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 81.  
N. S. Wales, and Queensland.
- 6791 DEFLECTA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 86.  
Australia.
- 6792 DEFLORATA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 79.  
King George's Sound, W. Australia.
- 6793 DELICATULA Chap. Ann. Soc. Ent. Belg. 1877. XX. p. 78.  
Tasmania and S. Australia.

- 6801 **EXARATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 93.  
Rockhampton, Queensland.
- 6802 **EXPLANATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 94.  
Swan River, W. Australia.
- 6803 **FALLAX** Newm. The Entomol. 1842, p. 415.  
Victoria.
- 6804 **FASTIDIOSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 81.  
Australia.
- 6805 **FERRUGATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 92.  
Tasmania.
- 6806 **FESTIVA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 83.  
Victoria.
- 6807 **FLAVEOLA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 80.  
Port Denison, Queensland.
- 6808 **FLAVITARSIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 75.  
Tasmania.
- 6809 **FORAMINOSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 73.  
Rockhampton, Queensland.
- 6810 **FORMOSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 69.  
Sydney, N. S. Wales.
- 6811 **FRATERNA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 86.  
Australia.
- 6812 **FULVOGUTTATA** Baly, Journ. of Ent. II. 1864, p. 298.  
Adelaide, S. Australia.
- 6813 **FUSCITARSIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
Australia.
- 6814 **FUSCONOTATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 94.  
King George's Sound, W. Australia.
- 6815 **FUSCULA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
Australia.
- 6816 **GEMINA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 76.  
Adelaide, S. Australia.

- 6820 **GLOBULOSA** Chap. Ann. Soc. Ent. Belg. 1.  
Australia.
- 6821 **GRANARIA** Chap Ann. Soc. Ent. Belg. 187  
King George's Sound, W. Australia.
- 6822 **GRANULOSA** Boisd. Voy. Astrol. Col. p. 56  
Cat. 3 ed. p. 419.  
Australia.
- 6823 **GRAPHICA** Chap. Ann. Soc. Ent. Belg. 1877  
Sydney, N. S. Wales.
- 6824 **HAMADRYAS** Stal, Diagn. 1860, p. 465.  
Tasmania.
- 6825 **HASTATA** Chap. Ann. Soc. Ent. Belg. 1877, .  
King George's Sound, W. Australia.
- 6826 **HECTICA** Boisd. Voy. Astrol. Col. p. 569.  
Australia.
- 6827 **HEMISPHERICA** Chap. Ann. Soc. Ent. Belg. 1  
Australia.
- 6828 **HERA** Stal, Diagn. 1860, p. 465.  
Tasmania.
- 6829 **IMPRESSA** Chap. Ann. Soc. Ent. Belg. 1877,  
Sydney. N. S. Wales.

- 6831 *INCERTA* Chap. Ann. Soc. Ent. Belg. 1877, XX., p. 80.  
*testacea* Marsh. Trans. Linn. Soc. IX. 1808, p. 289, t. 24,  
f. 10 ; Boisd. Voy. Astrol. Col. p. 567, (nom. præocc.).  
Adelaide, S. Australia.
- 6832 *INCURVA* Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865,  
p. 412.  
Champion Bay, W. Australia.
- 6833 *INFUSCATA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 93.  
Australia.
- 6834 *INSIGNITA* Newm. The Entomol. 1842, p. 414.  
Victoria.
- 6835 *INSPERSA* Newm. The Entomol. 1842, p. 415.  
Victoria.
- 6836 *INTACTA* Newm. The Entomol. 1842, p. 414.  
Victoria.
- 6837 *INTERLITA* Newm. The Entomol. 1842, p. 414.  
Victoria.
- 6838 *INTERRUPTA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 84.  
N. S. Wales.
- 6839 *INTERSTITIALIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 80.  
Australia.
- 6840 *INTERTINCTA* Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865,  
p. 411.  
Champion Bay, W. Australia.
- 6841 *IRINA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 82.  
Port Denison, Queensland.
- 6842 *IRIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 74.  
Eclipse Island. N. E. Australia.
- 6843 *IRRISA* Newm. The Entomol. 1842, p. 415.  
Victoria.
- 6844 *IRRORATA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 69.  
King George's Sound, W. Australia.

- 6848 *LEPIDA* Erichs. Wieg. Arch. 1842, I. p.  
Tasmania.
- 6849 *LIGNEA* Erichs. Wieg. Arch. 1842, I. p. 1  
Tasmania.
- 6850 *LINEATA* Marsh. Trans. Linn. Soc. IX. 1808  
f. 2 ; Erichs. Wieg. Arch. 1842, I. p.  
Tasmania.
- 6851 *LITIGIOSA* Chap. Ann. Soc. Ent. Belg. 1877,  
Port Denison, Queensland.
- 6852 *LITURATA* Marsh. Trans. Linn. Soc. IX. 1808  
f. 5 ; Boisd. Voy. Astrol. Col. p. 566.  
Sydney, N. S. Wales.
- 6853 *LIVIDA* Chap. Ann. Soc. Ent. Belg. 1877, XI  
Adelaide, S. Australia.
- 6854 *LOWNEI* Baly, Journ. of Ent. II. 1864, p. 29  
Sydney, N. S. Wales.
- 6855 *LUCIDULA* Chap. Ann. Soc. Ent. Belg. 1877,  
N. S. Wales and Victoria.
- 6856 *LUTEA* Marsh. Trans. Linn. Soc. IX. 1808, p.  
Baly, Journ. of Ent. II. 1864, p. 304.

- 6858 **MARMOREA** Oliv. Ent. V. p. 599, t. 1. f. 4 ; Baly, Journ. of Ent. II. p. 302.  
*maculata* Marsh. Trans. Linn. Soc. IX. 1808, p. 287, t. 24, f. 5 ; Boisd. Voy. Astrol. Col. p. 566.  
Sydney, N. S. Wales.
- 6859 **MEDIOVITTATA** Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865, p. 404.  
W. Australia.
- 6860 **MELANOSPILA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 92.  
N. S. Wales and Victoria.
- 6861 **MERA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 74.  
Port Denison, Queensland.
- 6862 **METALLICA** Motsch. Schrenck. Reis. II. 1860, p. 192, note 1.  
Australia.
- 6863 **M-FUSCUM** Bohem. Res. Eugen. p. 174.  
Sydney, N. S. Wales.
- 6864 **MILIARIS** Boisd. Voy. Astrol. Col. p. 566 ; Dej. Cat. 3 ed. p. 419.  
*reticulata* Chevrol. Dej. Cat. 3 ed. p. 419.  
Australia.
- 6865 **MINOR** Marsh. Trans. Linn. Soc. IX. 1808, p. 289, t. 24, f. 9 ; Boisd. Voy. Astrol. Col. p. 572.  
*bifasciata* W. S. Macleay, Dej. Cat. 3 ed. p. 419.  
Australia.
- 6866 **MITIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 83.  
Australia.
- 6867 **MODESTA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 83.  
King George's Sound, W. Australia.
- 6868 **MORBILLOSA** Boisd. Voy. Astrol. Col. p. 562 ; Dej. Cat. 3 ed. p. 419.  
Australia.

Australia.

6872 *NERVOSA* Clark, Trans. Ent. Soc. Lond.  
p. 413.

Champion Bay, W. Australia.

6873 *NIGERRIMA* Germ. Linn. Ent. III. 1848, p.  
Adelaide, S. Australia.

6874 *NIGRITA* Chap. Ann. Soc. Ent. Belg. 1877, .  
Adelaide, S. Australia.

6875 *NIGRITULA* Clark, Trans. Ent. Soc. Lond.  
p. 411.

Champion Bay, W. Australia.

6876 *NIGROCONSPERSA* Clark, Trans. Ent. Soc.  
1865, p. 409.

Champion Bay, W. Australia.

6877 *NIGROPICTA* Clark, Trans. Ent. Soc. Lond. s  
p. 412.

Champion Bay, W. Australia.

6878 *NIGROSCUTATA* Chap. Ann. Soc. Ent. Belg. 1  
Australia.

6879 *NIGROSTILLATA* Chap. Ann. Soc. Ent. Belg. 1  
Victoria.

- 6882 *NODOSA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 96.  
N. S. Wales, and Victoria.
- 6883 *NOTATA* Oliv. Ent. V. p. 604, t. 1, f. 14.  
Australia.
- 6884 *NOTATIPENNIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 77.  
Sydney, N. S. Wales.
- 6885 *NUCEA* Erichs. Wieg. Arch. 1842, I. p. 227.  
Tasmania.
- 6886 *OBLITERATA* Erichs. Wieg. Arch. 1842, I. p. 229.  
Tasmania.
- 6887 *OBLONGA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 72.  
Port Curtis, Queensland.
- 6888 *OBOVATA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 78.  
Tasmania, and Victoria.
- 6889 *OBSCURELLA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 90.  
Paroo River.
- 6890 *OBSOLETA* Oliv. Ent. V. p. 600, t. 1. f. 5 ; Marsh. Trans.  
Linn. Soc. IX. 1808, p. 288, t. 24, f. 8 ; Boisd. Voy.  
Astrol. p. 568 ; Baly, Journ. of Ent. II. p. 309 ; Dej.  
Cat. 3 ed. p. 419.  
Australia.
- 6891 *OCTOLINEATA* Gory, Guér. Jc. règn. anim. 1845, p. 300, t. 49,  
f. 7.  
Australia.
- 6892 *OCTOMACULATA* Marsh. Trans. Linn. Soc. IX. 1808, p. 294,  
t. 25, f. 10 ; Boisd. Voy. Astrol. Col. p. 572.  
Australia.
- 6893 *OCTOSIGNATA* Stal, Diagn. 1860, p. 465.  
Australia.
- 6894 *ORBICULARIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 90.  
Sydney, N. S. Wales.



Tasmania.

6898 *PACHYTA* Chap. Ann. Soc. Ent. Belg. 1877,  
Sydney, N. S. Wales.

6899 *PALLIDA* Oliv. Ent. V. p. 602, t. 1, f. 9.  
Australia.

6900 *PALLIDULA* Chap. Ann. Soc. Ent. Belg. 1877,  
Adelaide, S. Australia.

6901 *PANTHERINA* Fauv. Bull. Soc. Linn. Norm.  
p. 177.  
Sydney, N. S. Wales.

6902 *PAPHIA* Stal, Diagn. 1860, p. 464.  
Moreton Bay, Queensland.

6903 *PAPULENTA* Chap. Ann. Soc. Ent. Belg. 1877,  
*papulosa* Stal, Diagn. 1860, p. 465, (nom. p  
Tasmania.

6904 *PAPULIGERA* Stal, Diagn. 1860, p. 465.  
Australia.

6905 *PAPULOSA* Erichs. Wieg. Arch. 1842, I. p. 6.  
Tasmania.

6906 *PARDALIS* Chap. Ann. Soc. Ent. Belg. 1877. 2  
Australia.

- 6909 **PEDESTRIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 71.  
Wide Bay, Queensland.
- 6910 **PERPARVULA** Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865,  
p. 413.  
Champion Bay, W. Australia.
- 6911 **PERPLEXA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 73.  
Adelaide, S. Australia.
- 6912 **PICEA** Oliv. Ent. V. p. 599, t. 1, f. 3 ; Latr. Encycl. méth.  
X. 1825, p. 11 ; Motsch. Schrenck. Reis. II. 1860,  
p. 193.  
*immaculata* Marsh. Trans. Linn. Soc. IX. 1808, p. 291.  
t. 25, f. 4 ; Boisd. Voy. Astrol. Col. p. 565.  
Australia.
- 6913 **PICEOLA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 92.  
Australia.
- 6914 **PICTA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 74.  
Australia.
- 6915 **PICTIPES** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 68.  
Australia.
- 6916 **PICTIPENNIS** Bohem. Res. Eugen. p. 173.  
Sydney, N. S. Wales.
- 6917 **PICTURATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 89.  
Australia.
- 6918 **PLUVIALIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 77.  
Sydney, N. S. Wales.
- 6919 **POLYGLYPTA** Germ. Linn. Ent. III. 1848, p. 232.  
Adelaide, S. Australia.
- 6920 **POROSA** Erichs. Wieg. Arch. 1842, I. p. 226 ; Baly, Journ.  
of Ent. II. 1864, p. 310.  
Tasmania.
- 6921 **PROPINQUA** Baly, Journ. of Ent. II. 1864, p. 306.  
Adelaide, S. Australia.

70 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

6922 PROXIMA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 80.  
Queensland.

6923 PULCHELLA Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 89.  
Australia.

6924 PUNCTULATA Marsh. Trans. Linn. Soc. IX. 1808, p. 292,  
t. 25, f. 6; Boisd. Voy. Astrol. Col. p. 568.  
Australia.

6925 PUNCTULATA Boisd. Voy. Astrol. Col. p. 571; Dej. Cat.  
3 ed. p. 419.  
Australia

6926 PURPUREOUREA Clark, Trans. Ent. Soc. Lond. ser. 3, 1865,  
p. 407.  
Champion Bay, W. Australia.

6927 PURPUREOVIRIDIS Baly, Journ. of Ent. II. 1864, p. 250.  
N. Australia.

6928 REMOTA Germ. Linn. Ent. III. 1848, p. 234.  
Adelaid. S. Australia

- 6935 **RUPIPES** Fabr. Syst. El. I. 1801, p. 430 ; Oliv. Ent. V.  
p. 601, t. 1, f. 8.  
Australia.
- 6936 **RUFO-NIGRA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 97.  
Australia.
- 6937 **RUFITARSIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 68.  
Australia.
- 6938 **RUGOSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 91.  
Gippsland, Victoria.
- 6939 **RUGULOSA** Boisd. Voy. Astrol. Col. p. 565.  
Australia.
- 6940 **SANGUINEOTINCTA** Clark, Trans. Ent. Soc. Lond. ser. 3, II.  
1865, p. 409.  
Champion Bay, W. Australia.
- 6941 **SCABRA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 91.  
Australia.
- 6942 **SCALARIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 96.  
Gippsland, Victoria.
- 6943 **SCAPULA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 87.  
Sydney, N. S. Wales.
- 6944 **SCUTELLATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 86.  
N. S. Wales.
- 6945 **SEMIGLOBOSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 97.  
Adelaide, S. Australia.
- 6946 **SEMIPUNCTATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 72.  
Clarence River, N. S. Wales.
- 6947 **SERIATA** Germ. Linn. Ent. III. 1848, p. 234.  
Adelaide, S. Australia.
- 6948 **SERPIGINOSA** Erichs. Wieg. Arch. 1842, I. p. 228.  
Tasmania.

p. 110.  
Australia.

6952 SPECTABILIS Chap. Ann. Soc. Ent. Belg. 18  
Paroo River.

6953 SPILOTA Chap. Ann. Soc. Ent. Belg. 1877, X  
Australia.

6954 SPLENDENS W. S. Macleay, App. King's Sul  
Australia.

6955 STALI Chap. Ann. Soc. Ent. Belg. 1877, XX  
Rockhampton, Queensland.

6956 STICTICA Marsh. Trans. Linn. Soc. IX. 180  
f. 1.  
Australia.

6957 STILLATIPENNIS Chap. Ann. Soc. Ent. Belg. 1  
Australia.

6958 STRIGOSA Chap. Ann. Soc. Ent. Belg. 1877, 2  
Paroo River.

6959 STYGIA Chap. Ann. Soc. Ent. Belg. 1877, XX  
Melbourne, Victoria.

6960 SUBÆNESCENS Chap. Ann. Soc. Ent. Belg. 187  
N. S. Wales.

6961 SURAPICALIS Chap. Ann. Soc. Ent. Belg. 187

- 6963 **SUBFASCIATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 85.  
Adelaide, S. Australia.
- 6964 **SUBLIMBATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 94.  
Adelaide, S. Australia.
- 6965 **SUBLINEATA** Bohem. Res. Eugen. p. 174.  
Sydney, N. S. Wales.
- 6966 **SUBOVALIS** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 72.  
Gulf of Carpentaria, N. Australia.
- 6967 **SUBSTRIATA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 84.  
Australia.
- 6968 **SUSPICIOSA** Baly, Journ. of Ent. II. 1864, p. 297.  
Melbourne, Victoria.
- 6969 **SUTURALIS** Germ. Linn. Ent. III. 1848, p. 235.  
Adelaide, S. Australia.
- 6970 **SUTURELLA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 89.  
Australia.
- 6971 **TASMANICA** Baly, Journ. of Ent. II. 1864, p. 294.  
Tasmania.
- 6972 **TENEBROSA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 73.  
Port Denison, Queensland.
- 6973 **TENELLA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 83.  
Australia.
- 6974 **TESSELLATA** Clark, Trans. Ent. Soc. Lond. ser. 3, II. 1865,  
p. 408.  
Champion Bay, W. Australia.
- 6975 **TESTACEA** Oliv. Ent. V. 1807, p. 602, t. 1, f. 10 ; Motsch.  
Schrenck. Reis. II. 1860, p. 194.  
Australia.
- 6976 **TETRASPILOTA** Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 89.  
Victoria, and S. Australia.

- Australia.
- 6980 **TRIMACULATA** Chap. Ann. Soc. Ent. Belg  
Australia.
- 6981 **TRITÆNIATA** Stal, Diagn. 1860, p. 465.  
Tasmania.
- 6982 **TRIVITTATA** Chap. Ann. Soc. Ent. Belg. 18  
Gippsland, Victoria.
- 6983 **TUBERCULATA** Chap. Ann. Soc. Ent. Belg.  
Australia.
- 6984 **TURBATA** Chap. Ann. Soc. Ent. Belg. 1877,  
Champion Bay, W. Australia.
- 6985 **UMBRATA** Chap. Ann. Soc. Ent. Belg. 1877,  
Rockhampton, Queensland.
- 6986 **USTULATA** Oliv. Ent. V. p. 603, t. 1, f.  
Astrol. Col. p. 571.  
Australia.
- 6987 **UMBROSA** Chap. Ann. Soc. Ent. Belg. 1877,  
Sydney, N. S. Wales.
- 6988 **VARIABILIS** Chap. Ann. Soc. Ent. Belg. 187  
Adelaide, S. Australia.
- 6989 **VARIICOLLIS** Chap. Ann. Soc. Ent. Belg. 187  
Tasmania and Victoria.

- 6991 *VENUSTA* Erichs. Wieg. Arch. 1842, I. p. 221.  
Tasmania.
- 6992 *VENUSTULA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 84.  
Australia.
- 6993 *VERRUCICOLLIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 95.  
Sydney, N. S. Wales.
- 6994 *VERRUCIPENNIS* Clark, Trans. Ent. Soc. ser. 3, II. 1865,  
p. 414.  
Champion Bay, W. Australia.
- 6995 *VERRUCOSA* Marsh. Trans. Linn. Soc. IX. 1808, p. 290, t. 25,  
f. 2.  
Australia.
- 6996 *VICINA* Boisd. Voy. Astrol. Col. p. 570 ; Dej. Cat. 3 ed.  
p. 419.  
Australia.
- 6997 *VIRENS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 83.  
Victoria.
- 6998 *VIRIDULA* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 84.  
Sydney, N. S. Wales.
- 6999 *VITTIPENNIS* Bohem. Res. Eugen. p. 172.  
Sydney, N. S. Wales.
- 7000 *VULGARIS* Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 78.  
Australia.
- 7001 *WATERHOUSEI* Baly, Journ. of Ent. II. 1864, p. 296.  
Adelaide, S. Australia.
- 7002 *WILSONI* Baly, Journ. of Ent. II. 1864, p. 295.  
*testacea* Germ. Linn. Ent. III. 1848, p. 234, (nom. præocc.).  
Chap. Ann. Soc. Ent. Belg. 1877, XX. p. 68.  
Adelaide, S. Australia.



7004 BREWERI Baly, Trans. Ent. Soc. Lond.  
Rockhampton, Queensland.

ARSIPODA. Erichson.

7005 ACUMINATA Waterh. Trans. Ent. Soc. ser  
*substriata* Waterh. l.c. p. 132 (♀).  
King George's Sound, W. Australia.

7006 BICOLOR Waterh. Trans. Ent. Soc. Lond.  
p. 132.  
Sydney, N. S. Wales.

7007 BIFRONS Erichs. Wieg. Arch. 1842, I. 1  
Tasmania.

7008 CÆRULEATA Baly, Trans. Ent. Soc. Lond.  
W. Australia.

7009 CRASSICORNIS Waterh. Trans. Ent. Soc.  
1838, p. 131.  
Sydney, N. S. Wales.

7010 ERICHSONI Baly, Ann. Nat. Hist. ser. 5,  
Tasmania.

7011 FERMORATA Baly, Ann. Nat. Hist. ser.  
p. 440.  
Adelaide, S. Australia

- 7014 **FULVIPES** Baly, Trans. Ent. Soc. Lond. 1877, p. 284.  
Rockhampton, Queensland.
- 7015 **HÆMATODERA** Baly, Trans. Ent. Soc. Lond. 1877, p. 158.  
W. Australia.
- 7016 **HOLOMELÆNA** Germ. Linn. Ent. III. 1848, p. 243.  
Adelaide, S. Australia.
- 7017 **LOWNEI** Baly, Ann. Nat. Hist. ser. 3, XIV. 1864, p. 441.  
Sydney, N. S. Wales.
- 7018 **MACLEAYI** Baly, Ann. Nat. Hist. ser. 3, XIV. 1864, p. 441.  
Sydney, N. S. Wales.
- 7019 **NITIDA** Waterh. Trans. Ent. Soc. Lond. ser. 1, II. 1838,  
p. 131.  
King George's Sound, W. Australia.
- 7020 **OVATA** Waterh. Trans. Ent. Soc. Lond. ser. 1, II. 1838,  
p. 133.  
King George's Sound, W. Australia.
- 7021 **PARVULA** Jac. Ann. Mus. Civ. Gen. ser. 2, II. 1885, p. 34.  
Australia.
- 7022 **PICEIPES** Baly, Journ. Linn. Soc. 1878, XIII. p. 477.  
W. Australia.
- 7023 **RUGULOSA** Baly, Ann. Nat. Hist. ser. 3, XIV. 1864, p. 442.  
Melbourne, Victoria.
- 7024 **SMARAGDULA** Oliv. Ent. VI. p. 704, t. 4, f. 65.  
Australia.
- 7025 **VARIEGATA** Waterh. Trans. Ent. Soc. ser. 1, II. 1838, p. 133.  
Tasmania.

**CREPIDODERA. Chevrolat.**

- 7026 **DIMIDIATA** Baly, Trans. Ent. Soc. Lond. 1876, p. 586.  
Australia.
- 7027 **PARALLELA** Baly, Trans. Ent. Soc. Lond. 1877, p. 162.  
Sydney, N. S. Wales.

7030 *HALIA* Baly, Journ. Linn. Soc. Lond.  
W. Australia.

SICYLLUS. Jacoby.

7031 *SPLENDIDUS* Proc. Zool. Soc. 1885, p. 6  
Australia.

HALTICA. Geoffroy.

7032 *SPLENDIDA* Oliv. Ent. VI. p. 691, t. 3, f.  
Australia.

LACTICA. Erichson.

7033 *AUSTRALIS* Duviv. Stett. Ent. Zeit. 188.  
Queensland.

LONGITARSUS. Latreille.

7034 *SCUTELLATUS* Baly, Trans. Ent. Soc. Lond.  
Rockhampton, Queensland.

DOCEMA. Waterhouse.

7035 *COLLARIS* Baly, Trans. Ent. Soc. Lond. 18  
W. Australia.

APHTHONA. Chevrolat.

7036 *FULVICOLLIS* Jac. Ann. Mus. Civ. Gen. se  
Australia.

---

7039 LABIALIS Waterh. Trans. Ent. Soc. Lond. II. 1838, p. 183.  
(gen. dub.).  
Sydney, N. S. Wales.

7040 PICEA Waterh. Trans. Ent. Soc. Lond. II. 1838, p. 133.  
(gen. dub.).  
King George's Sound, W. Australia.

CHAETOCNEMA. Stephens.

7041 ALBERTISI Jac. Ann. Mus. Civ. Gen. ser. 2, II. 1885, p. 37.  
Australia.

7042 AUSTRALICA Baly, Trans. Ent. Soc. Lond. 1876, p. 597,  
(Plectroscelis).  
W. Australia.

7043 BREVICORNIS Baly, Trans. Ent. Soc. Lond. 1877, p. 317.  
W. Australia.

7044 CARINATA Baly, Trans. Ent. Soc. Lond. 1877, p. 174.  
W. Australia.

7045 ERICHSONI Baly, Trans. Ent. Soc. Lond. 1877, p. 175.  
Tasmania.

7046 FUSCO-MACULATA Baly, Trans. Ent. Soc. Lond. 1877, p. 174.  
W. Australia.

7047 LATICEPS Baly, Trans. Ent. Soc. Lond. 1877, p. 315.  
W. Australia.

7048 LATICOLLIS Baly, Trans. Ent. Soc. Lond. 1877, p. 316.  
W. Australia.

7049 MEGALOPOIDES Baly, Trans. Ent. Soc. Lond. 1877, p. 174.  
Rockhampton, Queensland.

7050 PROPINQUA Baly, Trans. Ent. Soc. Lond. 1877, p. 314.  
Adelaide, S. Australia.

7051 SUBMETALlescens Baly, Trans. Ent. Soc. Lond. 1877, p. 175.  
S. Australia.

*MACLEAYI* Baly, Trans. Ent. Soc. L  
p. 431.

Port Essington, N. Australia.

7055 *NIGROVARIA* W. S. Macleay, King's Surv  
p. 453.  
Australia.

*ÆDIONYCHIS*. Latreille.

7056 *HOWITTI* Baly, Journ. Linn. Soc. Lond. 2  
Sydney, N. S. Wales.

*SPHÆROMORPHA*. Baly.

7057 *SIMONI* Baly, Journ. Linn. Soc. Lond. XI  
Rockhampton, Queensland.

*DIBOLIA*. Latreille.

7058 *ÆNEA* Waterh. Trans. Ent. Soc. Lond. II.  
Sydney, N. S. Wales.

7059 *ÆNEONIGRA* Waterh. Trans. Ent. Soc. Lond  
King George's Sound, W. Australia.

7060 *DUBOULAYI* Baly, Trans. Ent. Soc. Lond. 1  
W. Australia.

7061 *OCHRACEA* Waterh. Trans. Ent. Soc. Lond.  
King George's Sound, W. Australia.

PSYLLIODES. Latreille.

- 7064 BREWERI Baly, Trans. Ent. Soc. Lond. 1876, p. 601.  
W. Australia.
- 7065 CHLOROPHANA Erichs. Wieg. Arch. 1842, I. p. 237.  
Tasmania.
- 7066 SCUTELLATA Waterh. Trans. Ent. Soc. Lond. II. 1838, p. 134.  
Sydney, N. S. Wales.
- 7067 QUADRIDENTATA Baly, Trans. Ent. Soc. Lond. 1876, p. 601.  
W. Australia.

ENNEAMERA. Harold.

- 7068 AUSTRALIS Baly, Ent. Month. Mag. XIII. 1876, p. 82.  
Rockhampton, Queensland.

Sub-Family. GALERUCIDES.

OIDES. Weber.

- 7069 ALBERTISI Jac. Proc. Zool. Soc. Lond. 1879, p. 788.  
Australia.
- 7070 ANTENNALIS Baly, Trans. Ent. Soc. Lond. 1881, p. 52.  
Queensland.
- 7071 CIRCUMDATA Baly, Journ. of Ent. I. 1861, p. 296 (Adorium).  
Moreton Bay, Queensland.
- 7072 DORSOSIGNATA Clark, Journ. of Ent. II. 1864, p. 258  
(Adorium).  
N. S. Wales, and Queensland.
- 7073 FRYI Clark, Journ. of Ent. II. 1864, p. 258 (Adorium).  
Queensland.
- 7074 SEMINIGRA Clark, Journ. of Ent. II. 1864, p. 258  
(Adorium).  
Australia.

*laevigata* Boisd. Voy. Astrol. Col. p. 55

Dej. Cat. 3 ed. p. 402.

Australia.

7077 CARTERETI Guér. Voy. Coquille, Zool. 18

Australia.

7078 CYANURA Hope, Gray, Zool. Misc. 1831, p.

*speciosa* Dej. Cat. 3 ed. p. 403.

Australia.

7079 MELANURA Oliv. Ent. VI. p. 625, t. 2, 1

Astrol. Col. p. 548.

Australia.

7080 NIGRIVESTIS Boisd. Voy. Astrol. Col. p. 54

Australia.

7081 PUNCTATA Boisd. Voy. Astrol. Col. p. 556

p. 403.

Australia.

7082 RELICTA Boisd. Voy. Astrol. Col. p. 557.

Australia.

7083 SCUTELLATA Boisd. Voy. Astrol. Col. p.

3 ed. p. 402.

Australia.

AGELASTICA Redtenbacher

**GALERUCELLA.** Crotch.

- 7086 **AUSTRALIS** Bohem. Res. Eugen. p. 176; Dej. Cat. 3 ed.  
p. 401.  
Sydney, N. S. Wales.

**CYDIPPA.** Chapuis.

- 7087 **BALYI** Chap. Gen. Col. XI. 1875, p. 216.  
Australia.

**RUPILIA.** Clark.

- 7088 **RUFICOLLIS** Clark, Journ. of Ent. II. 1864, p. 260, t. 12, f. 3.  
N. S. Wales.
- 7089 **VIRIDIÆNEA** Clark, Journ. of Ent. II. 1864, p. 260.  
Queensland.

**ELLOPIA.** Chapuis.

- 7090 **PEDESTRIS** Erichs. Wieg. Arch. 1842, I. p. 234, (*Galeruca*);  
Chap. Gen. Col. XI. 1875, p. 218.  
Australia, and Tasmania.

**MENIPPUS.** Clark.

- 7091 **CYNICUS** Clark, Journ. of Ent. II. 1864, p. 257.  
Port Denison, Queensland.

**SYNODITA.** Chapuis.

- 7092 **BORREI** Chap. Gen. Col. XI. 1875, p. 232.  
Sydney, N. S. Wales.

**MONOLEPTA.** Erichson.

- 7093 **CROCEICOLLIS** Germ. Linn. Ent. III. 1848, p. 243.  
Adelaide, S. Australia.
- 7094 **HUMERALIS** Weber, Obs. ent. I. p. 56.  
*humeralis* Fabr. Syst. El. I. p. 460: Oliv. Ent. VI. p. 629,  
t. 3, f. 33; Boisd. Voy. Astrol. Col. p. 551.  
Australia.



p. 557, v. 3, l. 88.

Australia.

7098 *SUTURALIS* Boisd. Voy. Astrol. Col. p. 556  
p. 407.

Australia.

Sub-Family. **HISPIDES.**

**LEUCISPA.** Chapuis.

7099 *ODEWAHNI* Baly, Trans. Ent. Soc. Lond. 1869  
Chapuis, Gen. Col. XI. 1875, p. 266.  
Gawler, S. Australia.

**APROIDA.** Pascoe.

7100 *BALYI* Pascoe, Journ. of Ent. II. 1863, p. 55,  
Pine Mountain, &c., Queensland.

**EURYSPA.** Baly.

7101 *ALBIPENNIS* Germ. Linn. Ent. III. 1848, p. 2  
Hispid. 1858, p. 86.  
Adelaide, S. Australia.

7102 *HOWITTI* Baly, Trans. Ent. Soc. Lond. 1869,  
Melbourne, Victoria.

OXYCEPHALA. Guérin.

- 7105 TESTACEA Fabr. Syst. El. II. p. 25 ; Baly, Cat. p. 162.  
Australia.

PROMECOTHECA. Blanchard.

- 7106 CALLOSA Baly, Ent. Month. Mag. XIII. 1876, p. 128.  
Australia.

- 7107 VARIPES Baly, Cat. Hispid. 1858, p. 88.  
N. Australia.

ERIONISPA. Chapuis.

- 7108 BADENI Chap. Gen. Col. XI. 1875, p. 302.  
Australia.

MONOCHIRUS, Chapuis.

- 7109 AUSTRALICA Motsch. Schrenck. Reis. II. 1860, p. 239  
(Hispa).  
Australia.

- 7110 COARCTATUS Chap. Ann. Soc. Ent. Belg. XX. 1877, p. 48.  
N. S. Wales.

- 7111 FIMBRIATUS Chap. Ann. Soc. Ent. Belg. XX. 1877, p. 47.  
Tasmania.

- 7112 GERMARI Chap. Ann. Soc. Ent. Belg. XX. 1877, p. 48.  
Gulf of Carpentaria, N. Australia.

- 7113 MULTISPINOSUS Germ. Linn. Ent. III. 1848, p. 246.  
Adelaide, S. Australia.

Sub-Family. CASSIDIDES.

HOPLIONOTA. Hope.

- 7114 DORSALIS Waterh. Ann. Nat. Hist. 1877, p. 424.  
Queensland.

7117 BOISDUVALI Bohem. Mon. II. p. 283.

Australia.

7118 DEUSTA Fabr. Syst. Ent. p. 89 ; Oliv. Ent.

t. 1, f. 17 ; Bohem. Mon. II. p. 333.

*angulifera* Blanch. Voy. Pôle Sud, IV. p. 3

*corallina* Boisd. Voy. Astrol. Col. p. 541 ;

Dej. Cat. 3 ed. p. 398.

Australia.

7119 DOUEI Bohem. Cat. Brit. Mus. IX. 1856, p.

Australia.

7120 INTERRUPTA Fabr. Syst. Ent. p. 89 ; Oliv.

p. 953, t. 2, f. 34 ; Bohem. Mon. IV. p. 1

Australia.

7121 MACLEAYI Bohem. Cat. Brit. Mus. IX. 1856,

Australia.

7122 MACULATISSIMA Bohem. Cat. Brit. Mus. IX. 18

Australia.

7123 NIGRODORSATA Bohem. Cat. Brit. Mus. IX. 18

Australia.

7124 RAMULOPICTA Wag. Mth. Münch. 1877, p. 65.

Brisbane, Queensland.

7125 SEPTEMCOSTATA Wag. Mth. Münch. 1881, p. 4

Doubtful

7127 WESTWOODI Bohem. Mon. II. p. 254.  
Australia.

CASSIDA. Linné.

7128 DENTICULATA Bohem. Cat. Brit. Mus. IX. 1856, p. 137.  
Australia.

7129 MERA Germ. Linn. Ent. III. 1848, p. 246.  
Adelaide, S. Australia.

7130 NAVICELLA Bohem. Mon. IV. p. 331.  
Australia.

7131 PERPUSILLA Bohem. Mon. IV. p. 335.  
Melbourne, Victoria.

COPTOCYCLA. Boheman.

7132 AUSTRALICA Bohem. Mon. III. p. 257.  
Australia.

7133 COMPUNCTA Bohem. Mon. III. p. 290.  
Australia.

7134 HOLMGRENI Bohem. Mon. IV. p. 465.  
Port Essington, N. Australia.

7135 SAPPHO Bohem. Mon. IV. p. 427.  
Australia.

## Family. EROTYLIDÆ.

### Sub-Family. LANGURIDES.

LANGURIA. Latreille.

7136 ALBERTISI Harold, MT. Münch. ent. Ver. III. 1879, p. 81.  
Australia.

7137 MILITARIS Harold, MT. Münch. ent. Ver. III. 1879, p. 80.  
Australia.

7138 PICEA Harold, MT. Münch. ent. Ver. III. 1879, p. 66.  
Somerset, Cape York.

7139 VULGARIS Harold, MT. Münch. ent. Ver. III. 1879, p. 90.  
Somerset, Cape York.

7141 GRANULATA Lacord. Mon. Fab. Erotyl. 184  
Australia.

7142 OPACA Crotch, Cist. Ent. XIII. 1876, Revi  
Sydney, N. S. Wales.

7143 PICTIPENNIS Crotch, Cist. Ent. XIII. 1876,  
Sydney, N. S. Wales.

7144 RUDEPUNCTA Crotch, Cist. Ent. XIII, 1876,  
Rockhampton, Queensland.

THALLIS. Erichson.

7145 BIFASCIATA Crotch, Cist. Ent. XIII. 1876, R  
Rockhampton, Queensland.

7146 COMPTA Ericha. Wieg. Arch. 1842, I. p.  
Linn. Ent. III. 1848, p. 244.  
Adelaide, S. Australia.

7147 ERICHSONI Crotch, Cist. Ent. XIII. 1876, Re  
Sydney, N. S. Wales.

7148 JANTHINA Ericha. Wieg. Arch. 1842, I. p. 2  
Tasmania.

7149 INSUETA Crotch, Cist. Ent. XIII. 1876, Revis  
Queensland

Family. ENDOMYCHIDÆ.

MYCELLA. Chapuis.

- 7151 LINEELLA Chap. Gen. Col. XII. 1875, p. 105, note.  
Rockhampton, Queensland.

DAULIS. Erichson.

- 7152 CIMICOIDES Erichs. Wieg. Arch. 1842, I. p. 242, t. 5, f. 5 ;  
Gerstäck. Mon. p. 207, t. 2, f. 44.  
Tasmania.

Family. COCCINELLIDÆ.

COCCINELLA. Linné.

- 7153 CONFORMIS Boisd. Voy. Astrol. Col. p. 604 ; Muls. Spec.  
p. 261 ; Dej. Cat. 3 ed. p. 457.  
Australia.
- 7154 KINGI W. S. Macleay, King's Surv. Austral. II. 1827,  
p. 454.  
Australia.
- 7155 LEONINA Fabr. Syst. Ent. p. 87 ; Oliv. Ent. VI. p. 1059,  
t. 2, f. 21, a-b ; Muls. Spec. p. 128.  
*Tasmani*, White, Voy. Ereb. Terr. XI. 1846, p. 23.  
Australia and Tasmania.
- 7156 TRANSVERSALIS Fab. Spec. Ins. I. 1781, p. 97.  
var. *contempta* Boisd. Voy. Astrol. Col. p. 592.  
var. *tricincta* Erichs. Wieg. Arch. 1842, I. p. 121.  
*varians* Fabr. Suppl. Ent. Syst. 1798, p. 78.  
Australia and Tasmania.

HALYZIA. Mulsant.

- 7157 EDWARDSI Muls. Spec. Trim. Securip. 1851, p. 158.  
Queensland.
- 7158 GALBULA Muls. Spec. Trim. Securip. 1851, p. 166.  
Australia.

90 CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA,

7159 MELLYI Muls. Spec. Trim. Securip. 1851, p. 160.  
Australia.

7160 PASCOEI Crotch, Revis. Coc. 1874, p. 131.  
Australia.

7161 VARICOLOR Muls. Spec. Trim. Securip. 1851, p. 154.  
Sydney, N. S. Wales.

7162 VARIEGATA Fabr. Spec. Ins. I. 1781, p. 99.  
*18 notata* Oliv. Ent. VI. p. 1029, t. 6, f. 86.  
Australia.

NEDA. Mulsant.

7163 BOURGEOISI De Kerville, Ann. Soc. Ent. Fr. (6), IV. p. 70,  
t. 4, f. 7.  
Australia.

7164 DUPLICATA Crotch, Revis. Coc. 1874, p. 161.  
N Australia.

7165 PRINCIPS Muls. Spec. Trim. Securip. 1851, p. 278 ; Crotch,  
Revis Coc 1874 p. 169

7170 *LINEOLA* Fabr. Syst. Ent. p. 79 ; Oliv. Ent. VI. p. 995, t. 3, f. 33 ; Crotch, Revis. Coc. 1874, p. 176.

*striola* Schönh. Syn. Ins. I. 2, p. 156 ; Muls. Spec. Trim. Securip. 1851, p. 367.

var. *strigula* Boisd. Voy. Astrol. Col. p. 601, t. 8, f. 27 ; Muls. Spec. Trim. Securip. 1851, p. 366.

var. *oblita* Latr. Dej. Cat. 3 ed. p. 459.

N. S. Wales.

CHILOCORUS Leach.

7171 *AUSTRALASIÆ* De Kerville, Ann. Soc. Ent. Fr. (6) IV. p. 69, t. 4, f. 8.

Australia.

ORCUS Mulsant.

7172 *AUSTRALASIÆ* Boisd. Voy. Astrol. Col. 1835, p. 593 ; Muls. Spec. Trim. Securip. 1851, p. 468 ; Dej. Cat. 3 ed. p. 460.

var. *nummularis* Boisd. Voy. Astrol. Col. 1835, p. 594 ; Muls. l.c. p. 469 ; W. S. Macleay, Dej. Cat. 3 ed. p. 460.

Australia and Tasmania.

7173 *BILUNULATUS* Boisd. Voy. Astrol. Col. 1835, p. 594 ; Muls. Spec. Trim. Securip. 1851, p. 467 ; Dej. Cat. 3 ed. p. 460.

Australia.

7174 *CHALYBEUS* Boisd. Voy. Astrol. Col. 1835, p. 595 ; Muls. Spec. Trim. Securip. 1851, p. 471 ; Dej. Cat. 3 ed. p. 460.

*cyanus* W. S. Macleay, Dej. Cat. 3 ed. p. 460.

Australia.

7175 *CYANOCEPHALUS* Muls. Spec. Trim. Securip. 1851, p. 467.  
Port Essington, N. Australia.

7176 *LAFERTEI* Muls. Opusc. ent. III. 1853, p. 63.  
Moreton Bay, Queensland.



NOVIUS. Mulsant.

7179 **CARDINALIS** Muls. Spec. Trim. Securip. 18  
Australia.

7180 **SANGUINOLENTUS** Muls. Spec. Trim. Secur.  
Australia.

**HYPOCERAS.** Chapuis.

7181 **MULSANTI** Chap. Gen. Col. XII. 1876, p. 1  
Rockingham Bay, Queensland.

**RHIZOBIUS.** Stephens.

7182 **BAJULUS** Muls. Spec. Trim. Securip. 1851, 1  
Queensland.

7183 **BAKEWELLI** Crotch, Revis. p. 297.  
Queensland.

7184 **BOUCARDI** Crotch, Revis. p. 297.  
Moreton Bay, Queensland.

7185 **BREWERI** Crotch, Revis. p. 298.  
Swan River, W. Australia.

7186 **CARNIFEX** Muls. Spec. Trim. Securip. 1851,  
*foveiventris* Muls. Opusc. ent. III. 1853, 1  
Queensland.

7187 **DISCOLOR** Erichs. Wieg. Arch. 1842, I.  
Spec. Trim. Securip. 1851, p. 1004.  
Tasmania.

7189 *EVANSI* Muls. Spec. Trim. Securip. 1851, p. 1006.

Adelaide, S. Australia.

7190 *HIRTELLUS* Crotch, Revis. Coc. p. 298.

Queensland.

7191 *SUBMETALLICUS* Crotch, Revis. Coc. p. 298.

Swan River, W. Australia.

7192 *VENTRALIS* Erichs. Wieg. Arch. 1842, I. p. 239 ; Muls.

Spec. Trim. Securip. 1851, p. 1005.

Adelaide, S. Australia.

7193 *XANTHURUS* Muls. Spec. Trim. Securip. 1851, p. 1005.

Victoria.

PHARUS. Mulsant.

7194 *STRAGULATUS* Erichs. Wieg. Arch. 1842, I. p. 240 ; Crotch,

Revis. p. 299.

Tasmania.

EPILACHNA. Chevrolat.

7195 *BOISDUVALI* Muls. Spec. Trim. Securip. 1851, p. 765.

Australia.

7196 *GUTTATOPUSTULATA* Fabr. Syst. Ent. p. 87 ; Oliv. Ent. VI.

p. 1050, t. 3, f. 35 ; Muls. Spec. 1851, p. 716.

var. *Pandora* Muls. Opusc. ent. III. p. 109.

var. *tasmanica* Crotch, Revis. Coc. p. 78.

Australia, and Tasmania.

7197 *SUFFUSA* Crotch, Revis. Coc. p. 78.

Australia.

7198 *UNDECIMVARIOLATA* Boisd. Voy. Astrol. Col. p. 591.

*stigmula* Muls. Spec. Trim. Securip. 1851, p. 782.

Tasmania.

7199 *VIGINTIOCTOPUNCTATA* Fabr. Syst. Ent. 1775, p. 84.

*recta* Muls. Spec. Trim. Securip. 1851, p. 836.

Australia.

7201 THORACICUS Erichs. Wieg. Arch. 184  
Tasmania.

## NOTE ON SOME TRILOBITES NEW TO AUSTRALIA.

BY F. RATTE, ING. DES ARTS ET MANUF., PARIS.

LICHAS PALMATA variety SINUATA, *emend.* from L. SINUATA.

*Lichas sinuata*, Ratte, Proc. Linn. Soc. N. S. W., 1886, Vol. I, (2 ser.), p. 1065.

(Plate I, fig. 6.)

At the meeting of November last, I announced the discovery of silicified pygidia of *Lichas* in the Upper Silurian Limestone of Wellington. During the printing of the paper it was suggested to me to name some of the fossils I had figured, as it was thought better to do so even at the risk of creating a synonym, than to leave them unnamed. I, therefore, decided to do so, *provisionally*, at least, for some of the fossils sufficiently represented, and in a footnote, (page 1065) I proposed the name of *Lichas sinuata*, in consequence of deep sinuses situated at the posterior angles of the four lateral ribs of the pygidium. I also remarked that our specimens strongly resemble *Lichas hirsutus*, Fletcher, and *Lichas palmata*, Barrande, both belonging to Upper Silurian Rocks. I indeed do not find much difference between these two species, at least from the descriptions given (1). In both, the margin of the pygidium is raised sufficiently to form a prominent pad which joins with the two extreme spines and with the four lateral ones which are produced beyond of the margin. This character, however, is very slightly, if at all, indicated in our fossil. If any of the figures at hand, in the absence of any other works,

---

(1) In fact Barrande says, p. 602 :—" La forme figurée par notre ami, M. Fletcher, de Dudley, sous le nom de *Lichas hirsutus*, nous paraît "identique avec celle que nous décrivons."

...the sinuses, which are very exaggerated  
are very distinct, if not so deep, in Barrande  
figure.

**ACIDASPIS** sp. near **A. DORMITZERI**,

Barrande, Syst. Sil. 1852, p. 728, Pl. 38, fig.

(Plate II, figs. 1 and 1 bis.)

The specimen here recorded is very nearly remarkable for its minuteness, being exactly 5 mm including the spines of the pygidium.

It was found at Bowning by Mr. J. Mitchell a great number of other trilobites, &c.

Although nearly complete, and on that account figured, still this specimen leaves doubt as to the frontal margin, as well as of some slight details in the in consequence of its minuteness it leaves also doubt of other parts. As the figures of other species referred seen in Barrande's work I will only quote the commenting at any length. They all have nine body.

*Acidaspis Leonhardi*, Barr. p. 720, pl. 37, fig. 1

*Acidaspis Hoernesii*, Barr. p. 723, pl. 38, fig. 30

*Acidaspis Geinitziana*, Cord. p. 725, pl. 39, fig. 1  
about 14 mm.

*Acidaspis ruderalis*, Cord. p. 733, pl. 37, fig. 32, length 30 mm.

With all of these, including *A. Dormitzeri*, our specimen exhibits some characters in common. Thus it resembles *A. minuta* in regard to the pygidium and in some degree the rounded outline of the head; while this species (*A. minuta*), differs from all others mentioned by having three tubercles instead of one, on the pleural ridges, not including one at the origin of the pleural spines.

The pygidium does not seem to agree perfectly with that of any of those mentioned; besides it is smaller, being at the utmost one eighth of the length, not including the spines; while in *A. Dormitzeri* and *A. minuta* it is one seventh of the length, and in the other more than that proportion. (1)

The drawings being sufficiently enlarged to show all the visible characters, I shall abstain from a lengthy description, and insist only on the principal features.

The length of the head is less than one third of the whole length not including the spines. The median part of the glabella is narrow, its width being a little less than one-fifth of the width of the head. The distance between the false grooves which limit that median part and the eye is a little more than the width of the median part of the glabella, leaving ample room for the internal triangle of the fixed cheek. This triangle includes on the specimen four or five tubercles which are visible on both sides of the lateral nodules of the glabella (those nodules, two on each side, are bounded by the median, the posterior and the occipital furrows). In *A. Leonhardi*, *A. Hoernesii*, *A. Geinitziana*, the above-mentioned triangle is considerably reduced, and in *L. Roemeri* is completely absent or replaced by a groove instead of an elongated nodule.

---

(1) In fig. 22, pl. 38 of Barrande, the pygidium is certainly more than one seventh, say one sixth of the length, but I quote Barrande's text p. 728, "La tête occupe un peu moins du tiers, et le pygidium un septième de la longueur totale." As the author says *totale*, it is possible that in this case he included the spinal ornaments, although I doubt it.

The eyes in our specimen are prominent and much brought forwards compared with those in other allied species. What is missing is the frontal margin, including the two triangular grooves, by which it is connected with the ocular ridges and the facial suture. This frontal margin, in some, is adorned with series of tubercles (*A. minuta*, *A. Leonhardi*, *A. Roemeri*), while in others it is smooth (*A. Hoernesii*). Barrande says that the head of *A. Dormitzi* is similar to that of *A. Leonhardi*, but his (figure 22, pl 38), of the former does not show tuberculations at the frontal margin.

Further, the head of our fossil exhibits a more rounded outline than any of the other species considered. I will explain it simply. Let us draw a straight line parallel to the axis of the body and passing by the origin of one of the genal spines. In *Acidaspis Dufrenoyi*, Barr., (Pl. 38, fig. 25), this line will form an angle with the external border of the movable cheek, which is nearly straight giving to the head the shape of a triangle. In some of the species mentioned such as *A. Hoernesii*, *A. Dormitzi*,

or with such figures as I could compare it ; 1st, the external outline of the movable cheeks, and 2nd, the proportion that the length of the pygidium bears to the length of the body, which proportion is smaller than in any of the species brought into comparison with it. It therefore remains to be named, or to be identified with some species unknown to me.

All the species mentioned above are placed by Barrande in his " Etage E, Faune III," except *A. Hoernesii*, which belongs to his " Etage, F, Faune, IV," and is found also in the next " Etage."

On the same piece of rock with this minute *Acidaspis* is a hollow impression of *Staurocephalus* with which I shall deal hereafter.

#### ACIDASPIS near *A. LEONHARDI*, Barr.

Barrande, Syst. Sil. 1852, p. 720, Pl. 37, fig. 1.

(Plate II., figs. 2-4.)

The remains of *Acidaspis* in the Bowring beds are rare indeed, compared with those of *Encrinurus*, *Phacops*, *Sphærexochus*, *Calymene*, and *Bronteus*. (1) For the above reason, I will exhaust the materials I have in hand and represent three more specimens, two from Mr. Mitchell, and another given by him to the Museum.

They all include the median part of the head only, and cannot be properly identified, although the resemblance of one (fig. 4) to *A. Leonhradi* is rather strong. The chief difference is that in one of them especially (fig. 3), the internal triangle of the fixed cheek of

---

(1) The earliest mention that I know of the genus in Australia is by Chas. Jenkins, Esq., of Yass, in Proc. Linn. Soc. Vol. III. pl. 17, where he represents *A. Brightii* from the lower part of the Hume beds. I find *A. Brightii*, Murch. from the Wenloch limestone, Dudley, figured in Murchison's Siluria, pl. 18. However, from these data only it seems hardly possible to ascertain this identification beyond doubt. (See also Barr. Sil. Syst. p. 752, and in Phil. and Salter, Mem. Geol. Surv. Gt. Brit. 1848, Vol. 2, part I. pl. IX). The pygidium of *A. Brightii* as represented by Mr. Jenkins, somewhat resembles that represented by me in Proc. Linn. Soc. Vol. I. 2 ser. pl. 15, fig. 12. (Subsequently I have been given to understand that this gentleman did not intend to insist on the identification.)



which I have already spoken, is broader than in *A. Leonhardi*. It would therefore come nearer to *A. Dormitzeri* on that account, but, as I have already said (p. 98), although Barrande does not describe the head of the last species on the ground of its similarity to that of the former, still he does not represent the frontal margin of *A. Dormitzeri* with the granulation which exists in *A. Leonhardi*. These three specimens might belong to two or even three different species.

One of the specimens being very well preserved, as regards the granulation of the glabella, I have represented it increased four times, viz, twice as much as the others, in order to show more exactly all the details.

STAUROCEPHALUS near *S. Murchisoni*, Barr.

Barrande, Sil. Syst. p. 812, pl. 43, Salter, Brit. Trilob. p. 84, pl. 7.

(Plate II, figs. 59.)

the furrows of the glabella are not apparent in our specimens, and that the median part of the head seems also more slender, becoming narrower as it reaches the globular projection.

The great difference is in the pygidium, which, although composed of the same number of pleuræ, is broader and has a nearly flat surface, and only shows the origin of appendages on the outer margin, where unfortunately the prolongations of these appendages are broken (fig. 6). The dimensions of the last specimen are as follows :—

Length 17 mm.

Breadth 10 mm.

Length of head  $6\frac{1}{2}$  mm.

Length of pygidium  $1\frac{1}{2}$  mm.

Width of pygidium 3 mm.

One specimen, (fig. 7) which was lent to me from the Department of Mines for comparison, shows only the head, which is 10 mm. in length, corresponding to about 26 mm. for the total length of the animal without the appendages of the pygidium, and 15 to 16 mm. in breadth.

## EXPLANATION OF PLATES.

(Plate I).

### DIAGRAMS OF PYGIDIA. FIGS. 1-6.

Fig. 1.—*Lichas hirsutus*, Fletcher (= *L. palmata*, Barr.) Journ. Geol. Soc. 1850, pl. XXVII., bis, fig. 2.  $\times 2$ .

Fig. 2.—Id. id. Loc. cit., pl. XXVII., fig. 6.  $\times 2$ .

Fig. 3.—Id. id. Loc. cit., pl. XXVII., fig. 5.  $\times 2$ .

Fig. 4.—*Lichas palmata*, Barr. Système Silur. Bohem., pl. 28, fig. 1.

Fig. 5.—Id. Loc. cit., fig. 9. This fig. is accompanied in Barrande's work by the following remark :—" Pygidium isolé, dont l'axe est très-prolongé, et dont les tubercules spiniformes sont très-développés sur le contour."  $\times 2$ .

Fig. 6.—*Lichas palmata* var. *sinuata*.  $\times 3$ .

Fig. 4.—Head of *Acidaspis* near *A. Leonhardi*. × 4.

Fig. 5.—*Staurocephalus* near *S. Murchisoni*, Barr. H.  
× 2.

Fig. 6.—*Staurocephalus* near *S. Murchisoni*, Barr. Cc  
× 2.

Fig. 7.—Head of same. (Coll. Geol. Surv. N. S. W.,  
× 2.

Fig. 8.—Head of same. × 2.

Fig. 9.—Head of same showing denticulated border. × 2.

N.B.—Unless otherwise stated, the specimens of *Acidaspis* have been kindly lent by M. J. Mitchell, and are

NOTE ON THE MODE OF NIDIFICATION OF A SPECIES  
OF *PACHYCEPHALA*, SUPPOSED TO BE *P. GILBERTII*, FROM THE INTERIOR OF N. S. WALES.

By K. H. BENNETT.

Whilst riding across a portion of the Kilfern Station in the Western Division of the Colony, on the 24th of October last, my attention was attracted by observing the tail of a bird protruding from the upper surface of an old nest of a *Pomatostomus*, placed in a small Mulga tree, some 12 feet from the ground. As I rode beneath the tree the bird flew off, and perched on a neighbouring branch. I at once recognised it as a bird that I had met with on two or three occasions previously in my wanderings, but which was extremely rare, and which I took to be a *Pachycephala*, but to what species referable I could not say. Since then, however, I have examined the plates in Gould's Work on the "Birds of Australia," and have also carefully examined the species of *Pachycephala*, in the Sydney Museum, and am of opinion that the bird in question is *P. Gilbertii*. Having never previously come across the nest of this bird I was curious to see the eggs, though at the same time I was very doubtful about eggs being there at all, as the situation of the supposed nest was so different from that usually chosen by this family of birds. On ascending the tree I found that the bird had actually chosen that situation for its nest, but to my disappointment the bird was only building, as was evidenced by finding a newly made, somewhat cup-shaped nest within the old one of the *Pomatostomus*. On the 3rd of November, having occasion to pass within a few miles of the same place, I determined to gratify my curiosity as regarded the eggs, and made a detour for this purpose. On reaching the tree I again observed



## FLOWERING SEASONS OF AUSTRALIAN PLANTS.

BY E. HAVILAND, F.L.S.

No. 3.—PLANTS FLOWERING IN THE NEIGHBOURHOOD OF SYDNEY DURING THE MONTH OF SEPTEMBER, IN ADDITION TO THOSE ENUMERATED IN LISTS FOR JULY AND AUGUST, MOST OF WHICH ARE STILL IN FLOWER.

Dilleniaceæ—

*Hibbertia fasciculata.*

Cruciferae—

*Cakile maritima.*

Violaceæ—

*Viola betonicifolia.*

Pittosporæ—

*Marianthus procumbens*

*Pittosporum undulatum.*

Polygaleæ—

*Comesperma volubile.*

Tremandreae—

*Tetratheca juncea*

„ *ericoides.*

Rutaceæ—

*Correa speciosa* var *canensis*

*Philotheca australis.*

Lineæ—

*Linum marginale.*

Euphorbiaceæ—

*Phyllanthus thymoides*

*Breynia oblongifolia.*

Stackhousiaceæ—

*Stackhousia muricata*

„ *viminea.*

Ficoideæ—

*Tetragonia expansa.*

Leguminosæ—

*Bossia microphylla*

*Acacia stricta*

*Pultenaea flexilis*

„ *retusa*

*Daviesia ulicina*

*Gompholobium minus*

„ *latifolium*

*Mirbelia reticulata.*

Myrtaceæ—

*Leptospermum parvifolium*

„ *attenuatum*

*Bæckeia crenulata*

„ *diosmifolia.*

Rhamnaceæ—

*Pomaderris lanigera*

„ *elliptica*

Loranthaceæ—

*Notothixos subaureus.*

Proteaceæ—

*Grevillea laurifolia*

„ *buxifolia*

*Hakea dactyloides.*

	<i>Caleana</i>
<i>Solanum aviculare.</i>	<i>Calochilus</i>
Scrophularinæ—	<i>Glossodia</i>
<i>Veronica plebeia.</i>	<i>Prasophyllum</i>
Labiatae—	Irideæ—
<i>Plectranthus parviflorus.</i>	<i>Patersonia</i>
Epacrideæ—	Amaryllideæ—
<i>Styphelia triflora</i>	<i>Hypoxis lutea</i>
<i>Monotoca scoparia.</i>	Liliaceæ—
	<i>Burchardia umbellata.</i>

NOTES ON THE METHOD ADOPTED BY THE FEMALE  
OF THE COMMON FRESHWATER TORTOISE *CHELO-  
DINA LONGICOLLIS*, IN THE EXCAVATION OF  
THE BURROWS IN WHICH HER EGGS ARE TO  
BE DEPOSITED.

By H. J. MCCOOEY, BLAYNEY.

1. *Chelodina longicollis*. This strange-looking Freshwater Tortoise which has been compared to a snake threaded through a turtle, is at the present time, midsummer, engaged in the processes of nidification and deposition of her eggs ; and I have taken the opportunity of watching the proceedings with particular attention during the last fortnight, in the neighbourhood of Blayney, with the following results, viz. :—

(1st). The tortoises come out of the Balabula River and travel into the cultivation paddocks, a distance, in some instances, of fifteen chains to deposit their eggs. (2nd). *They carry with them a supply of water* which they vomit into the holes to soften the earth while they dig. They begin operations early in the morning by scratching a small hole about an inch deep, always using their hind claws. Into the depression thus made they vomit or squirt a quantity of water, and immediately resume the scratching process. Having cleared out the mud formed by the water, and being again on the dry surface, they again vomit water into the hole and again scratch out the mud. They continue in this manner until the hole has been sunk to the required depth, viz., about seven inches. The quantity of water they use in the operation of sinking or burrowing out one of these holes is quite surprising. As far as I can make out fully a pint is used. If the ground be extra dry and hard, and their supply of water run



Dr. Ramsay exhibited a number of rare T. H. Boyer-Bower's collection, for comparison allied species from New South Wales:—  
W. A.; *Ægotheles leucogaster*, Gould, *australis*, N. S. W.; *C. longirostris*, Gould, *ferruginea*, W. A.; *L. leucogaster*, W. A.; N. S. W.; *E. crocea*, W. A.; *Myiag* *Estrela bichenovii*, Gould, N. S. W.; W. A.; *Poëphila acuticauda*, W. A.; Aust.; *P. cincta*, Queensland.

[REDACTED]

**WEDNESDAY, 23RD FEBRUARY, 1887.**

---

**The Monthly Meeting of this Society was held in the Linnean Hall, Ithaca Road, Elizabeth Bay, on Wednesday evening, 23rd February, 1887.**

---

**The President, Professor W. J. Stephens, M.A., F.G.S., in the Chair.**

---

**Mr. T. S. Rigg, and Mr. J. R. Reid, Bengal Civil Service, were present as visitors.**

---

**Mr. Henry J. Brown, Newcastle, was elected a Member of the Society.**

---

**The President announced that the next Excursion had been arranged for Saturday, March 19th, Members to meet at the Redfern Railway Station, to proceed by the 8.13 a.m. train to the National Park.**

---

**DONATIONS.**

**"United States Commission of Fish and Fisheries." Parts I.-IX. "Reports of the Commissioner" for the years 1871-81, (9 Vols.); "Odontornithes: A Monograph on the Extinct Toothed Birds of North America." By Prof. O. C. Marsh; "Key to North American Birds." By Dr. Elliott Coues; "Birds of the**

Diseases which proceed from them." By  
Translated by W. E. Hoyle, M.A. ; " Report  
appointed to inquire into the methods of Oys  
United Kingdom and France." (1870) ; " Rep  
Lobster Fisheries of England and Wales, Sco  
(1877) ; Also, Ten (10) Papers on Ichthyology.  
"The Scottish Geographical Magazine." Vol.  
1887. *From the Hon. William Macleay, F.L.S*

"Forest Culture and Eucalyptus Trees.  
Cooper ; "Notes on Australian Plants," (Conti  
and "On two Species of Sterculia, discover  
son, Esq., in New Britain." By Baron von  
*Baron von Mueller, K.C.M.G., F.R.S., &c.*

"Proceedings of the Royal Physical Soci  
Vol. IX., Part I. 1886. *From the Society.*

"Zoologischer Anzeiger." IX. Jahrg. No. 24  
and Index 1886. *From the Editor.*

"Abstract of Proceedings of the Zoological Sc  
December 21st, 1886. *From the Society.*

"Plants Indigenous in the neighbourhood of Sy

"The Canadian Record of Science." Vol. II., No. 5. *From the Natural History Society of Montreal.*

"The Victorian Naturalist" Vol. III., No. 10. Feb. 1887. *From the Field Naturalists' Club of Victoria.*

"A History of the Fishes of Madeira." By Richard Thomas Lowe, M.A. *From Dr. Ramsay, F.R.S.E.*

"Revue Coloniale Internationale." Tome IV., No. 1. Jan., 1887. *From L' Association Coloniale Néerlandaise à Amsterdam.*

"Annalen des K. K. Naturhistorischen Hofmuseums." (Wien). Redigirt von Dr. von Hauer. Band I., No. 3. *From the Director.*

"Memoirs of the Geological Survey of India:—Palæontologia Indica." Ser. X., Vol. IV., Part II., and Addendum to Part I. By R. Lydekker, B.A., F.G.S. *From the Director.*

"Feuille des Jeunes Naturalistes." No. 195, 1st Jan., 1887. *From the Editor.*

"Comptes Rendus des Séances de L' Académie des Sciences, Paris." Tome CIII., Nos. 17-21, 1886, and "Tables des Comptes Rendus, &c," 2nde Semestre 1885. Tome CI. *From the Academy.*

"Studies from the Biological Laboratory of the Johns Hopkins University, Baltimore." Vol. III., Nos. 6 and 7. May and June, 1886; "University Circulars." Vol. V., Nos. 49 and 50. May and June, 1886. *From the University.*

"Proceedings of the Academy of Natural Sciences of Philadelphia." Part I. Jan. to March, 1886. *From the Academy.*

"Transactions of the New York Academy of Sciences." Vol. V., Nos. 2-6. Nov. 1885 to March, 1886; "Annals of the New York Academy of Sciences." Vol. III., Nos. 9 and 10, Dec. 1885. *From the Academy.*



PAPERS READ.

## MISCELLANEA ENTOMOLOGICA, No. III.

### THE SCARITIDÆ OF NEW HOLLAND.

BY WILLIAM MACLEAY, F.L.S., &c.

The Scaritidæ (or Bipartiti of Latreille), are very numerous represented in Australia, and are certainly the most beautiful of all the groups of the Carabidæ, their colours exhibiting infinite varieties of gem-like brilliancy and metallic lustre. It is perhaps also of all others the group which has been most completely worked up. Professor Westwood was the first to endeavour to throw some light upon these at that time very little known insects, he having described or redescribed all the species then known (19 species) of the genera *Carenum* and *Scaraphites* in the "Arcana Entomologica," Vol. I, 1845, and the Trans. Ent. Soc. Lond. Vol. V. 1849.

In January 1863, I published a paper (1) on the Scaritidæ in which I added considerably to the number, and gave descriptions of all the species previously known. My next paper read in March 1864 (2), added 27 to the list of Australian Scaritidæ. In a third paper (3), read in March 1865, I added 30 to the list, and introduced the new genus *Euryscaphus* for the reception of some large species which seemed to be intermediate between *Carenum* and *Scaraphites*. I also at the end of that paper gave a tabular list of all the species of *Carenum*, subdivided into numerous sections founded upon easily recognizable differences in form and sculpture. In 1867 Count Castelnau (4) described over thirty new species, formed a new genus, *Neocarenum*, for the reception of some insects of which my *Carenum elongatum* is the type, and

---

(1) Trans. Ent. Soc. N. S. Wales, Vol. 1, p. 55.

(2) Trans. Ent. Soc. N. S. Wales, Vol. I. p. 134.

(3) Trans. Ent. Soc. N. S. Wales, Vol. I. p. 176.

(4) Trans. Roy. Soc. Vict. VIII. p. 120.

paper from me (2) in which 21 new species were described. Since then but little has been done in I described eight new species in the "Insects of formed the genus *Philoscaphus* for the group *tuberculatum* is the type, and in 1873, (4) I species to the list. In 1874, Bates described in the "Monthly Magazine," nine species from West . a new genus, *Teratidium*. In 1883, I added from Queensland, and in December 1886, the burn (6) described two South Australian species *Euryscaphus*.

This makes the number of species in all 18 which have accumulated in my collection since subject, and which I describe further on.

My object in now reverting to this old and false because I find that the enormous increase in the number of the group has so outgrown the old tabular arrangement which I made more than 20 years ago, that a fresh classification has become very desirable if not necessary. I have been compelled in my effort to make my revision distinct and intelligible as it is in my power considerably to the number of genera, so that to be proposed arrangement the genus *Carenium* of Bone for 14 genera. My definition of these, give

---

(1) Ann. Ent. Soc. Belg. Tom. VI. p. 127

and not very definite, but that I find unavoidable, as there are very few marked distinguishing features in the group, and even these run into one another in the most puzzling manner.

Group, CARENIDES.

*Mentum* large, flat, carinated in the middle, the median tooth very strong.

*Labium* cut squarely in front, the paraglossæ slightly passing it.

*Palpi* more or less securiform.

*Maxillæ* straight, rounded at the apex.

*Mandibles* strongly toothed on the internal side.

*Labrum* short.

*Antennæ* short, compressed, moniliform or filiform.

*Thorax and elytra* of variable form.

*Anterior tibiæ* strongly palmate and toothed externally.

*Tarsi* simple in both sexes.

*Body* apterous.

This group I propose to distribute into the following genera :—

*Monocentrum*, *Teratidium*, *Carenidium*, *Conopterum*, *Neocarenum*, *Eutoma*, *Carenoscaphus*, *Carenum*, *Calliscapterus*, *Platythorax*, *Laccopterum*, *Philoscaphus*, *Euryscaphus*, and *Scaraphites*.

Genus, MONOCENTRUM, Chaud.

Of very narrow elongate form. Head large, antennæ short, robust, compressed, submoniliform; labial palpi securiform. Frontal canals deep, diverging behind. Thorax much longer than broad. Elytra narrow, cylindrical. Anterior tibiæ unidentate externally. Ventral segments impunctate.

Three species have been assigned to this genus, all from Northern Queensland. *M. megacephalum* (*Carenum megacephalum*) Westwood, *M. grandiceps*, Chaud. and *M. longiceps*, Chaud. I have one specimen of the *grandiceps* from the Dawson River, the only one of the genus I have seen.



Head very large, frontal canals deep and mandibles very strong, clypeus and labrum em short, slender, attenuated at the apex. securiform. Thorax broader than the length oval; anterior tibiæ strongly bidentate external segments with the two setigerous punctures exc

The insects referable to this genus are of the most part of great brilliancy. Baron de Chaudoir has placed the genus on my *Carenum gagatinum*, and mon have added to it—*C. Damelii*, Macl.; *Spaldingleriæ*, Macl.; *lacustre*, Macl.; *sapphirinum*, Ba *mucronatum* will also fall into this genus, as *Darlingense*, *Chaudoiri*, *septentrionale* and the descriptions of which are given at the

#### Genus, CONOPTERUM, CHAUDOIR

This genus only differs from *Carenidium*: labrum not or very little emarginate, the anterior elytra more pointed towards the apex, and erect horn springing from the inner tooth of the mandible conspicuously on the left mandible.

This genus was suggested by Baron de Chaudoir, any defined characters, for an insect from North America which he gives the specific name of *insigne*. In the same genus two species described by Count Cuvier, names of *Carenum eunephum* and *Carenum*

Genus, *NEOCARENUM*, Casteln.

Of elongate form and parallel-sided. Labrum short not emarginate, palpi slightly securiform. Antennæ submoniliform. Anterior thighs and tibiæ as in *Eutoma*, intermediate tibiæ strongly unidentate at the outer apex, and serrate above. A row of sublateral punctures on the elytra.

Count Castlenau established this genus on my *Carenum elongatum*. The species since added are *Neocarenum cylindripenne*, Bates; *Mastersi*, MacL.; *retusum*, Bates; *rugosulum*, MacL., and *singulare*, Casteln.

Genus, *EUTOMA*, Newman.

Very narrow and of cylindrical form. Head large, profoundly bisulcate in front; labrum not or scarcely emarginate, very short. Maxillary palpi triangular, labial securiform. Antennæ submoniliform. Thorax longer than wide. Anterior tibiæ strongly bidentate externally; anterior thighs notched and angled beneath near the apex.

The species of this genus are numerous and distinguished for brilliancy of colouring; they are for the most part of small size and were originally classed as one of the subdivisions of *Carenum*. They may be divided into those with two impressed punctures on the elytra, and those with four.

The first division consists of—

*E. bipunctatum*, MacL.

*cavipenne*, Bates.

*cupripenne*, MacL.

*episcopale*, Casteln.

*filiforme*, Casteln.

*glaberrimum*, MacL.

*laeve*, Casteln.

*Loddonense*, Casteln.

*undulatum*, MacL.

*E. Mastersi*, MacL.

*Newmani*, Casteln.

*punctipenne*, MacL.

*purpuratum*, Casteln.

*splendidum*, MacL.

*subrugosulum*, MacL.

*substriatulum*, MacL.

*tinctilatum*, Newm.

*violaceum*, MacL.

which seem to be intermediate between *Eut* proper. The form is elongated and parallel-rather flatter than in *Eutoma*, the labrum not palpi moderately securiform, the antennæ monilicane nearly parallel, the thorax longer or as elytra quadri-punctate, the anterior tibiæ bident anterior thighs slightly notched.

The species formerly placed in *Carenum*, coming are—

<i>C. scaritoides</i> , Westw.	<i>C. subquadratu</i>
<i>atronitens</i> , Macl.	<i>striato-punctu</i>
<i>oblongus</i> , Macl.	<i>coracinus</i> , M.
<i>intermedius</i> , Westw.	<i>gawlerensis</i> ,
<i>nigerrimus</i> , Macl.	<i>devastator</i> , C.
<i>ambiguus</i> , Macl.	<i>angustipenni</i>

I also place in this genus, though they look so it, *C. quadripunctatus*, Macl., and *C. sumptuosu* describe further on a new species—*C. lucidus*, w placed in this group.

#### Genus, CARENUM, Bonelli.

Under this name I include the three groups of *C. Bonellii*, *C. marginatum* and *C. perplexum* as types. The antennæ are less moniliform than

1. Elytra with four punctures.

<i>C. Bonellii</i> , Brulle.	<i>C. Castelnau</i> , Chaud.
<i>affine</i> , Macl.	<i>sexpunctatum</i> , Macl.
<i>viridipenne</i> , Westw.	<i>cyanipenne</i> , Macl.
<i>anthracinum</i> , Macl.	<i>opacum</i> , Macl.
<i>interruptum</i> , Macl.	<i>triste</i> , Macl.
<i>obscurum</i> , Macl.	<i>occultum</i> , Macl.
<i>simile</i> , Macl.	<i>ovipenne</i> , Macl.
<i>Brisbanense</i> , Casteln.	<i>submetallicum</i> , Macl.
<i>ebeninum</i> , Casteln.	<i>pusillum</i> , Macl.
<i>Westwoodii</i> , Casteln.	<i>purpureo-marginatum</i> , n. sp.

2. Elytra with two punctures.

<i>C. marginatum</i> , Boisd.	<i>C. convexum</i> , Chaud.
<i>laevigatum</i> , Macl.	<i>Kingii</i> , Macl.
<i>puncticolle</i> , Macl.	<i>propinquum</i> , Macl.
<i>punctulatum</i> , Macl.	<i>nitescens</i> , Macl.
<i>scitulum</i> , Macl.	<i>viridi-marginatum</i> , Macl.
<i>Murrumbidge</i> nse, Macl.	<i>politulum</i> , Macl.
<i>laterale</i> , Macl.	<i>planipenne</i> , Macl.
<i>subporcatulum</i> , Macl.	<i>subplanatum</i> , Bates.
<i>striatopunctatum</i> , Macl.	<i>Batesi</i> , Masters.
<i>frontale</i> , Macl.	<i>Terræ-reginæ</i> , Macl.
<i>carbonarium</i> , Casteln.	<i>ianthinum</i> , Macl.

3. Elytra without punctures.

<i>C. politum</i> , Westw.	<i>C. subcostatum</i> , Macl.
<i>perplexum</i> , White.	<i>De Visii</i> , Macl.
<i>laevipenne</i> , Macl.	<i>ineditum</i> , Macl.

Genus, CALLISCAPTERUS.

Head large, frontal canals short, only slightly diverging, palpi scarcely securiform, antennæ moderately slender not moniliform, labrum biemarginate; thorax broad and semicircular, elytra broadly ovate and convex, anterior tibiæ tridentate externally. This is a very showy and handsome group. The species hitherto classed with *Carenum* which are referable to this genus are

<i>splendens</i> , Casteln.	<i>porphyreus</i>
<i>Oederhni</i> , Casteln.	<i>breviformis</i>

Elytra with four puncture

*C. cyaneus*, Fab.

### Genus, PLATYTHORAX.

Head transverse, the frontal canals short antennæ slender, the palpi not securiform, the elytra transverse and rectangular, anterior tibiæ less strong than the posterior in *Carenum* and with several smallish teeth formed this genus for a very curious insect described years ago under the name of *Carenum rectangulum*. *transversicollis*, Chaud., will also enter this genus.

### Genus, LACCOPTERUM.

The type of this genus is *Carenum Spencii*. All the species are all of rather small size. The antennæ short, the palpi are triangular, the labrum short, the elytra oval and more or less convex, the foveæ, the anterior tibiæ are strongly tridentate, the intermediate have a strong spine on the outer margin. The species are—

<i>L. deauratum</i> , MacL.	<i>L. variolosum</i> , Muls.
<i>gemmatum</i> , Westw.	<i>Darwiniense</i> , Muls.
<i>foveigerum</i> , Chaud.	<i>foveigerum</i> , Muls.

## Genus, PHILOSCAPHUS.

Head broad, rather short, the frontal canals deep and short, the labrum a little emarginate, the palpi scarcely thicker towards the apex, antennæ filiform. Thorax much broader than long, of semi-circular form. Elytra broad and tuberculate, with a sublateral carina. Anterior tibiæ tridentate externally, intermediate unidentate. The species are

*P. tuberculatus*, Macl.*P. costalis*, Macl.*Mastersi*, Macl.*carinatus*, Macl.*P. lateralis*, Macl.

## Genus, EURYSCAPHUS, Macleay.

Head large, the frontal canals short and parallel, the antennæ rather long and filiform, the labrum large and transverse, the maxillary palpi very slightly triangular at the apex, the labial a little more so. Thorax transversal. Elytra as broad as long, convex, almost circular except at the base which is excised. Anterior tibiæ strongly bidentate externally, intermediate unidentate and serrate. All the species of this genus are of large size and broad convex form.

They seem to be exclusively insects of the interior parts of New Holland.

The species known are—

*E. affinis*, Casteln.*E. Howittii*, Casteln.*angulatus*, Macl.*minor*, Macl.*bipunctatus*, Macl.*obesus*, Macl.*carbonarius*, Casteln.*Waterhousei*, Macl.*dilatatus*, Macl.*Tatei*, Bates.*Hopei*, Casteln.*subsulcatus*, Bates.

## Genus, SCARAPHITES, Westw.

The insects of this genus are also of great size. The head is large, the frontal canals very short or merely depressions, the labrum very transverse and rugose, the palpi filiform, and the

antennæ short and submoniliform. Thorax transverse; elytra rather longer than wide, and broadest near the apex. Anterior tibiae very strongly tridentate externally, intermediate very strongly unidentate. Species—

<i>S. Bacchus</i> , Westw.	<i>S. latipennis</i> , MacI.
<i>crenaticollis</i> , MacI.	<i>Lencæus</i> , Westw.
<i>gigas</i> , Casteln.	<i>lucidus</i> , Chaud.
<i>heros</i> , Casteln.	<i>Macleayi</i> , Westw.
<i>hirtipes</i> , MacI.	<i>Martini</i> , Westw.
<i>humeralis</i> , Casteln.	<i>Mastersi</i> , MacI.
<i>intermedius</i> , MacI.	<i>rotundipennis</i> , Dej.
<i>laticollis</i> , MacI.	<i>Silenus</i> , Westw.

I subjoin descriptions of the new species.

#### CARENIDIUM DARLINGENSE, n. sp

Black, nitid, thorax margined with green, elytra dark violet margined with green. Head large, subnitid, eyes large, proni-

about equidistant from the suture and lateral margin. The anterior tibiae are strongly bidentate, the intermediate are minutely toothed, each ventral segment has two setigerous punctures near the base, the apical segment has four.

Length, 12 lines.

*Hab.*—Bourke District, Darling River.

CARENIDIUM CHAUDOIRII, n. sp.

Of less elongate form than the last. The upper surface entirely of a greenish blue, the under surface, legs, antennae, and the parts of the mouth piceous. Head large, of a very minute shagreen-like sculpture, eyes prominent, preocular angles less prominent than in *C. Darlingense*, and the frontal canals more diverging behind, clypeus much the same, the labrum short, semi-circular, and with four setigerous punctures. Thorax rather broader than the head; decidedly broader than the length, broadly cordiform, rather broadly margined on sides and base, the basal lobe short and truncate, the median line well marked, but not reaching the base or apex, and the whole disk transversely scratched. Elytra oblong-ovate, a little narrower than the thorax, about twice as long as broad, minutely punctate and striate under a powerful lens, a cluster of about nine punctures at the base and a regular row of setigerous punctures along the lateral margins. The anterior tibiae are bidentate externally, the teeth as well as the spurs on the inner side very strong and acute, the intermediate tibiae are very strongly ciliated.

Length, 13 lines.

*Hab.*—Endeavour River.

I dedicate this species to the memory of the late Baron Maximilian de Chaudoir, who was the founder of this genus, and whose works on the Australian Carabidae have been both valuable and voluminous.

CARENIDIUM DAMELII, Maccl.

Trans. Ent. Soc. N. S. Wales, Vol. II. p. 69.

I described this species from a single specimen got at Cape York. I have since received a fine specimen from the Dawson



centre. The elytra are oblong-oval, as br  
obsoletely punctate-striate, with an impressed  
humeral angle, another near the apex, se  
double row on the base, and a continuous  
margins. Length 16 lines.

#### CARENIDIUM SEPTENTRIONALE, 1

The under surface, head and legs black, the  
greenish-black, with bright green margins. 1  
narrower than the thorax, the frontal canals  
diverging behind, the eye prominent, with a c  
ately above it, the two setigerous punctures at  
together, the clypeus slightly emarginate sc  
labrum short, broad, and subcrescentic with six set  
The thorax is wider than the length, rather broad  
anterior angles but slightly prominent, the sides  
to the posterior angles, the basal lobe very short  
median line extending to the base, but not to the  
depressions near the posterior angles distinct  
elytra are narrower than the thorax, of a ne  
extremely minutely punctured in equally minut  
any impressed puncture on the disc, but with  
depression occupied by four punctures in a curv  
and one puncture above at the base, and a regul  
punctures on the lateral margins. The legs a  
present no apparent

*CARENIDIUM TROPICALE*, n. sp.

Somewhat like *C. Chaudoiri*, but much smaller. The upper surface is brilliant metallic green, the under surface, legs and parts of the mouth piceous. The head is slightly narrower than the thorax, prominently angled in front of the eyes, the forehead near the clypeus with a transverse curved shallow depression, the clypeus broadly and shallowly emarginate with on each side a strong prominent conical tooth, the labrum slightly crescentic with six setigerous punctures. Thorax much broader than the length, the sides and posterior angles almost semi-circularly rounded, the basal lobe recurved and slightly emarginate. Elytra oval, broadest near the middle and there as broad as the thorax, rather thinly covered with minute punctures, no impressed punctures on the disc, a row of punctures in the lateral margins and a slight depression at the base occupied by four punctures in a transverse row and others above on the external side.

Length, 9 lines.

*Hab.*—Endeavour River.

Chaudoir's genus *Conopterum* is very doubtfully characterised, but there are some species resembling *Conopterum insigne*, Chaud., which can scarcely be placed in *Carenidium*, and differ still more from *Eutoma* and *Carenum*. For these I shall adopt Chaudoir's name of *Conopterum*, and the following are the chief distinctive characters. Head like *Carenidium* but the labrum not deeply emarginate or declivous in front. Antennæ like *Carenidium*, but rather less attenuate towards the apex. Mandibles very strong with vertical horns. Elytra elongate, ovate, narrowing to the apex.

*CONOPTERUM VIOLACEUM*, n. sp.

Upper surface violet black with green borders, under surface and legs brownish black, the whole very nitid. Head large, scarcely so broad as the thorax at its widest part, the frontal canals deep and diverging behind, the clypeus and labrum

...s, gradually nar  
very feebly striate-punctate, the punctures la  
under a lens, a strongly impressed puncture  
angle and another near the apex, a cluster of  
shallow depression on the base, and a row of  
in the margin. The legs are like those of *Car*  
segments punctigerous.

Length, 10 lines.

*Hab.*—Mudgee district.

#### CONOPTERUM LITTORALE, n. s.

Of rather more robust form than *!.* *violaceu*  
above with green margins, black beneath, nitid  
the last, but the inner tooth of the left mandi  
a large blunt slightly recurved tooth or horn.  
similar to the last, but is slightly less transv  
lobe is not emarginate in the middle. The el  
ovate, but more broadly so than in the last, a  
the apex, feeble striæ are visible on them unde  
no impressed punctures on the disc, an indisti  
gerous punctures at the base and a row of th  
margins. In all else like the last.

Length, 10 lines.

*Hab.*—Richmond River.

clypeus there is a large prominent conical tooth or horn, the labrum is rather prominent in the middle, and a little emarginate on each side, with four large setigerous punctures; both mandibles have horns on the inner tooth, but that of the left mandible is much the largest. The thorax is broader than long, scarcely narrowed at the apex and rounded behind with the basal lobe almost truncate. Elytra elongate, almost parallel-sided, rounded in front and behind and not narrower at the apex than at the base, without any impressed punctures on the disc, with a cluster of six on the base, and a row of them in the lateral margins.

Length, 9 lines.

*Hab.*—Endeavour River.

CONOPTERUM BARNARDI, n. sp.

Blackish-green, nitid, with the margin of thorax and elytra bright green. The frontal canals diverging much behind, and joined in front by a transverse depression, the clypeus moderately emarginate and declivous, a strong conical tooth sloping backwards on the left mandible. The thorax is about as broad as long, the anterior angles a little produced, the basal lobe narrow and recurved. Elytra elongate oval, obsoletely striate-punctate, an impressed puncture near the humeral angle, and another near the outer apex, a number of punctures on the base and a distinct row of them on the lateral margins. The prosternum is rounded at the apex, flattened beneath, and irregularly impressed in the middle.

Length, 11 lines.

*Hab.*—Dawson River.

CONOPTERUM INCORNUTUM, n. sp,

I have some doubt as the genus of this insect. It differs from *Carenidium* in the shape of the labrum and clypeus, and from *Conopterum* in having the mandibles not horned; this however may be only a sexual difference. The colour is a nitid black with green margin, the tarsi, antennæ and palpi piceous. The head is finely acuducted, with some transverse striæ near the clypeus, that and the labrum are scarcely if at all emarginate. The thorax is like

*Hab.*—Richmond River (Coll. Masters).

EUTOMA PUNCTULATUM, n. sp.

Black, nitid, the margins of the thorax  
Head as broad as the thorax, the frontal  
diverging behind, the clypeus with two small  
the middle, the space between emarginate, and  
each side bounding the labrum which is short,  
punctured. Thorax much longer than wide, tri  
and rounded at the posterior angles, with the m  
little distance from the apex in a distinct  
thrice the length of the width, narrower than  
base, and gradually widening a little to the  
puncture about  $1/5$  from the apex, a fovea wit  
on the base near the humeral angle and a single  
suture, and a distant row of punctures on the  
very obsolete largish punctures in rows are disce

Length, 8 lines.

*Hab.*—Dawson River.

EUTOMA MAGNIFICUM, n. sp.

Entirely of a black color.

with a puncture a little below the humeral angle, and another near the apex, and a line of punctures on the base extending along the lateral margins.

Length, 7 lines.

*Hab*—Peak Downs.

EUTOMA BREVIPENNE, n. sp.

Entirely black, moderately nitid, the elytra slightly margined with purple, Head as in *punctulatum*. Thorax as in *punctulatum*. Elytra elongate-oval, not twice the length of the thorax, with a puncture a little behind the humeral angle, and another near the apex, a cluster of 3 or 4 punctures in a shallow depression on the base, and a few along the lateral margins.

Length,  $7\frac{1}{2}$  lines.

*Hab*.—Moreton Bay.

CARENOSCAPHUS LUCIDUS, n. sp.

Of elongate cylindrical form, and nitid black colour, with the thorax margined with green, and the elytra with a violet tint. Head large, transverse, the frontal canals deep and diverging behind. The clypeus emarginate and quadridentate. The thorax longer than wide, nearly truncate in front, the basal lobe short and rounded. Elytra very slightly narrowed at the base, three times longer than wide, a reflexed roundly pointed humeral angle, an impressed puncture behind the humeral angle, another near the apex, a row of punctures on the basal margins, beginning with a larger detached one near the suture, and a row of distant punctures in the lateral margin. The prosternum is longitudinally grooved.

Length, 13 lines.

*Hab*.—Dawson River.

... are broad and oval and faintly strong punctures on each elytron as in *C. Bonelli* punctures on the base near the humeral angles them in the lateral margins. Legs very strong

Length, 11 lines.

*Hab.*—Coonabarabran.

#### LACCOPTERUM LACUNOSUM, n. s.

Like *L. Spencei*, but smaller; the head as in thorax black bordered with bluish green, transverse angles a little emarginate and the base distinct scarcely so broad as the thorax, about twice squared at the base, the humeral angles prominent nearly parallel, with four rows of distinct foveæ each row of about six foveæ, the sutural row than the others, but all with a brilliant bright rows are separated by slightly rounded costæ, a lateral groove occupied by a row of strong punctures

Length, 7 lines.

*Hab.*—Coonabarabran.

The other sub-family of Scaritidæ, that with acutely pointed maxillæ, is not so numerous in Australia as the *Carenides*, and is moreover not Australian. The described Australian species are

*Dyschirius*; 8 species of *Scolyptus*, Putzeys; and 33 of *Clivina*, almost all described by Putzeys; in all 50 species. In Mr. Masters's Catalogue of Australian Coleoptera, the genus *Gnathoxys* of Westwood is included among the Scaritidæ. It seems to me however, that that genus would be more correctly associated with the *Cnemacanthidæ*, and in the vicinity of *Promecoderus*. I subjoin the description of a very distinct and curious form of the Family which Mr. Froggatt lately sent me from Russell River in the Cairns District of Northern Queensland.

Genus, STEGANOMMA.

Mentum large, concave and corrugated on the lateral lobes, with a strongly carinated median tooth. Maxillæ arcuated, and acutely pointed. Palpi long, slender and almost cylindrical. Mandibles arcuated, rather acute, bluntly bidentate on the inner edge. Labrum short, transverse, with four deep impressions in front. Antennæ short, submoniliform, the first joint large, the last oval. Head nearly square, the eyes not visible from above, two deep impressions between the eyes, a narrow bead along the anterior margin. Thorax almost square. Elytra profoundly striate, and widening a little to the apex. Anterior tibiæ tridentate, intermediate unidentate.

STEGANOMMA PORCATUM, n. sp.

Of rather elongate form, black and nitid. The head is wider than long, the frontal impression large with radiating corrugations. Thorax longer than broad, truncate in front, parallel-sided and slightly rounded at the base, with a transverse punctured stria near the apex and a deep median line from that to the base. Elytra about as long as the head and thorax together, narrower than the thorax at the base, a little amplified towards the apex, with six deep sharply punctured striæ on each elytron with the interstices smooth, convex, and gradually lessening towards the



*Hab.*—Russell River ; Cairns.

# FLOWERING SEASONS OF AUSTRALIAN PLANTS.

BY E. HAVILAND, F.L.S.

NO. 4.—PLANTS FLOWERING IN THE NEIGHBOURHOOD OF SYDNEY  
DURING THE MONTH OF OCTOBER, IN ADDITION TO THOSE  
ENUMERATED IN LISTS FOR JULY, AUGUST, AND SEPTEMBER.

## Ranunculaceæ—

*Ranunculus rivularis*  
„ *lappaceus.*

## Dilleniaceæ—

*Hibbertia diffusa*  
„ *nitida.*

## Polygaleæ—

*Comesperma retusum.*

## Rutaceæ—

*Boronia serrulata*  
„ *pinnata*  
„ *parviflora*  
*Asterolasia correifolia*  
*Eriostemon myoporoides.*

## Sterculiaceæ—

*Lasiopetalum rufum*  
„ *parviflorum*  
*Rulingia pannosa.*

## Euphorbiaceæ—

*Pseudanthus pimeloides.*

## Stackhousiaceæ—

*Stackhousia linarifolia.*

## Caryophyllæ—

*Polycarpon tetraphyllum*  
*Stellaria flaccida.*

## Polygonaceæ—

*Muehlenbeckia gracillima.*

## Leguminosæ—

*Oxylobium cordifolium*  
*Viminaria denudata*  
*Daviesia corymbosa*  
*Gompholobium virgatum*  
*Pultenaea scabra*  
*Acacia armata*  
*Bossicea prostrata*  
*Jacksonia scoparia*  
*Sphærolobium vimineum.*

## Myrtaceæ—

*Leptospermum stellatum*  
„ *lanigerum*  
*Kunzea capitata.*

## Olacineæ—

*Olax stricta.*

## Proteaceæ—

*Isopogon anemonifolius*

Compositæ—	<i>Galeola</i>
<i>Vittadinia scabra</i>	<i>Microtis</i>
Stylideæ—	Amaryllideæ—
<i>Stylidium laricifolium.</i>	<i>Hæmodo</i>
Goodeniaceæ—	Liliaceæ—
<i>Goodenia bellidifolia.</i>	<i>Dianella</i>
Gentianeæ—	<i>Laxmann</i>
<i>Sebæa ovata.</i>	<i>Sowerbæa</i>
Convolvulaceæ—	Najadeæ—
<i>Convolvulus Soldanella</i>	<i>Triglochin</i>
,, <i>erubescens.</i>	Xerotideæ—
Acanthaceæ—	<i>Xerotes fil</i>
<i>Ruellia australis.</i>	

## NOTES ON SOME AUSTRALIAN FOSSILS.

BY FELIX RATTE, M.E.

I.—*SALISBURIA PALMATA*, *emend.* from *JEANPAULIA* or *BAIERA*  
*PALMATA*, Ratte.

*Jeanpaulia* or *Baiera palmata*, Proc. Linn. Soc. N.S.W.,  
2nd ser. Vol. I. p. 1078, pl. XVII.

When I described the above I had been able to consult only the first two volumes of de Saporta's "Terrain Jurassique" in "Paléontologie Française." Tome III. of this work published in 1876-1879, deals with the Coniferous Plants. From the evidence here given, *Jeanpaulia* is no more to be considered as a fern. A great number of Jurassic species (1) have been described by M. Heer, and placed in the genus *Salisburia*, being, from their mode of fructification, generically identical with the actual *Ginkgo biloba*, Lin. (*Salisburia adiantifolia*, Sm.). Therefore this group of plants is dealt with by de Saporta under the heading

Trib. I. *SALISBURIAE*, l.c., p. 251.

This author says, p. 253. . . . . "ainsi que le remarque avec raison Mr. Heer, le type de ces *Salisburia* jurassiques s'écarte très-peu, sauf par la dimension plus petite et la forme plus ovoïde des graines du *Salisburia* vivant, tandis que les espèces wéaldiennes et crétacées (*Baiera*), s'en écartent bien davantage, circonstance qui explique pourquoi les affinités légitimes de ces dernières ont été si longtemps méconnues "

The figure given in Tome III. of *Baiera* (*Jeanpaulia*) *Münsteriana*, Presl., the type of the genus *Jeanpaulia*, and which is very

---

(1) From Cape Boheman (*Eisfjord*,—*Isfjord*.)

The author, page 256, says: "Malgré que les *Jeanpaulia* les mieux caractérisés: *Jeanpaulia* Presl. (*Baiera dichotoma*, Fr. Br.), *J. longifolia*, Pom.), etc., sont trop conformes à leur nervation, et le mode de partition de leur *Baiera* jurassiques et crétacés naguère désignés *Baiera*, pour ne pas leur être reliés à un type. Les seules différences sont les suivantes: les *Baiera* et *Jeanpaulia* ont des feuilles en coin (wedge) allongées et atténuées à la base sur un pétiole plus court et les segments sont moins divergents, plus allongés, les nervures (straps) une ou plusieurs fois divisées successives, etc.," . . . And at p. 262: "et *Salisburia* ont prédominé tour à tour dans le second à partir de l'oolithe; le premier dans le Rhétien, où les vestiges des *Salisburia* sont rares ou tout à fait incertains."

The two Permian genera *Ginkgophyllum* (Saporta, Comptes Rendus, t. LXXX p. 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000) are the prototypical *Salisburia* to this author.

It will be remembered that our *S. palmata* from the Wianamatta formation, now settled as *T. palmata*.

Further discoveries will be anxiously expected. The flowers of this beautiful plant to be known.

## II.—ON THE MUSCULAR IMPRESSION OF THE GENUS NOTOMYA

(MÆONIA.)

(Plate III.)

*Notomya (Mæonia) elongata*, Dana; Etheridge, Catal. Austr. Foss. p. 73; de Koninck, Foss. Pal. Nouv. Galles &c. (1877), Pt. 3, pl. 20, fig. 6, &c.

The specimen of this fossil represented by de Koninck is from Illawarra, and those in the Museum from the same district, have been collected at Jamberoo. There, all the carboniferous marine fossils are in sandstone, and it is very rare to find their tests.

However, de Koninck's figure does not show the remarkable peculiarities of the casts of these shells. The principal of these peculiarities is the fringed outline of the anterior muscular impression which, according to Dana (Amer. Jour. Science, (1847), IV. p. 158) is a character of his original genus, as well as another small impression similar to that of *Astarte*.

I give the figure of a good internal cast in the Museum, but as in this the fringed outline is rather defaced, I give separately the figure of the impression from another still better specimen.

(Plate IV.)

The figure that I give, of the specimen being will, I hope, afford material for the solution of the questions of mineralogy, mechanics &c.

In minerals the form of the fracture depends on the differences of elasticity along different axes. That, besides this, the greater the homogeneity of the material the nearer the form of the fracture will be to that by theory.

Some specimens of the so-called "Kerosene" fracture, perfect conchoidal fracture due to homogeneity, here represented is, no doubt, very complicated. It might be due to vibration, the lines being along the nodal lines. I also suggest that specimens of shale show a very distinct plane of stratification marked by fossil ferns, this may be the existence of what is very nearly a plane of fracture in a specimen.

In order to show how the fracture might be affected by the nodal lines I have represented a cross-section of a specimen showing a wavy surface.

#### NOTES AND EXHIBITS.

Dr. Ramsay exhibited a collection of insects from New England, containing some rare and choice specimens, among which were noticeable two new species of *Heteronympha*, *Heteronympha philerope*, *Epinephile Joanna*, (Butl.), and *Xenica lathoniella*, and several apparently new *Cicadæ*. Among the Coleoptera were some interesting species of *Schizorhina*, *S. bakewellii*, *atropunctata*, *bassii*, *palmata*, *phillipsii*, *ocellata*, *frontalis*, *bestii*, *dorsalis*, and a fine new species quite distinct from any other kind. Among the Buprestidæ were a bright blue and green *Curis*, a fine *Melobasis*, and some beautiful and rare species of *Stigmodera*, also two specimens of an apparently new form. Of longicorns there were *Tragocerus lepidopterus*, and a fine specimen of *Bimia*, which latter appears new.

Mr. E. Haviland exhibited a specimen of the aquatic plant *Ethulia conyzoides*, found by the Rev. F. E. Haviland in a lagoon in the Richmond River district, and read the following extract from a letter from Baron von Mueller relative thereto:—"Your plant is a highly interesting addition to the Australian flora. It is the *Ethulia conyzoides* of Linnæus, the son, who described it in 1762, from an Indian specimen. Since then it has been traced to many parts of tropical Asia; also to Madagascar and to Africa, from the entrance of the Nile to Senegal and Natal; but it has never been found in Europe. If there is no reason to suppose that the plant has been introduced through traffic or cultural circumstances, perhaps you will send a note to the Linnean Society of N. S. Wales on its occurrence near you. It is a good instance to show how valuable any sendings may prove for extending our knowledge of the geographical distribution of plants, and is also a proof of the manner in which aquatic plants become overlooked on account of their inaccessibility." Mr. E. Haviland stated that, after careful enquiry, he is satisfied that the plant has not been introduced, but is indigenous to Australia.



... .. for being closely allied  
*Baueri* by Brown in his Prodrum, and of  
only a single specimen, which was how  
Bentham in his remarks on *G. Baueri* (  
under *P. rufum*, throws doubt upon th  
Bauer's plant, and believes it to be an abn  
*rufum*, which Hooker referred to *P. l*  
discovery of the species found by me at  
Parramatta River, proves the existence of a  
found and figured by Bauer, and it must be  
and Hooker's views were incorrect and that  
real existence. Mr. Fitzgerald has obtain  
drawing from the British Museum, and has  
side of his figure of *P. Deanianum* by which  
seen. The specimen exhibited is, it is eviden  
its nearest allies, *P. nigricans* and *P. rufum*.

Mr. Deane also read part of a letter from  
acknowledging the distinctness of the species.

Mr. Deane also exhibited for Mr. Percy  
rib-like concretions found in pipe-clay at M  
River, evidently hardened remains of the s  
sition produced the pipe-clay.

Mr. Ratte exhibited a specimen of "keroser  
affordin - - - - -

specimens from other parts of the country of opossums which have been generally looked upon as local varieties of that species. Mr. Masters pointed out the marked differences in three of those exhibited, leaving little doubt of their being distinct species.

1. A specimen from King George's Sound of rather smaller size than *P. vulpina*, and with the tail shorter and the apical third white.

2. A Port Darwin Opossum, less than half the size of *P. vulpina* with the tail long, slender, and without conspicuous brush.

3. One from the interior of King George's Sound, much smaller than *P. vulpina*, of much softer fur, darker and more uniform colour, and with the tail brushy along its whole length.

Mr. Macleay exhibited, in connection with the paper read by him, a drawer of Australian Scaritidæ containing as he announced the largest and most complete collection of that group of insects in the world.

Dr. Oscar Katz exhibited pure test-tube cultures (in nutrient gelatine, and agar-agar) of pathogenic and saprophytic bacteria, cultivations of which he had recently obtained from Prof. Flügge, University of Göttingen. Unfortunately other very interesting ones sent were, on arrival in Sydney, found to be no longer capable of development. A number of pathogenic micro-organisms ought to be obtainable in Sydney, as infectious and contagious diseases, both in man and in animals, are well represented here. The exhibited virulent cultivations were :—(1.) *Staphylococcus pyogenes aureus*, the commonest of the pyogenic micrococci, and thoroughly characterised by its cultivation-appearances and its pathogenic nature as regards man. (2.) *Bacillus murisepticus* (Koch), or bacillus of mouse-septicæmia; a very minute microbe, which occurs here and there in putrefying liquids, and kills house-mice in about two days. Its cultures in nutritive gelatine offer a most beautiful aspect. (3.) *Bacillus of Swine-fever or pig typhoid*; this organism is the cause of that epidemic disease among swine in Europe, and is also fatal to mice, pigeons, and other animals. It resembles No. 2, in its morphological characters, and its pure cultures. (4.) *Bacillus crassus sputigenus* (Krebohm), or bacillus of salivary

it sometimes appears, as contamination, cultivating bacteria. The latter, a very produces the green-blue colour, which appearance on the material used for dye. This pigment, called pyocyanin, is also produced by the organism in its artificial cultivations. A series of slides were accompanied by diagrams, showing the various appearances of the bacteria, as examined under the microscope in the blood etc.

Dr. Foucart exhibited a large specimen of a fossil usually known as Meerschauum, from the Naamans, a freshwater deposit of silicate of alumina, containing the remains of leaves. These appear to belong to the Eocene, and are therefore in all probability of the Eocene or Miocene.

Mr. F. B. Kyngdon exhibited portions of fossilized wood from Piddington, near Mount Victoria, with impressions of *odontopteroides*, &c. Also, a concretionary bone of a spermwhale.

Dr. Cox exhibited a basketful of the fruit of *Eugenia Jambosa*, which is now in full bearing in the gardens. It has a very pronounced aroma analogous to that of Roses, and is used in the East Indies for medicinal purposes. Also a fine collection of Lepidoptera exhibited by late Mr. Kunstler at Perak.

The President exhibited for Dr. Ramsay a block of Shale from the Gosford Cutting, on which there appeared, besides *Phyllothea* and two fine examples of *Cleithrolepis*, a tadpole-like form about one inch long, and a quarter in greatest width. The head is remarkably similar to that of *Platycephalus Wilkinsonii* from the same cutting, as described at a recent meeting, though it is not distinct enough for absolute identification. There are evident indications of a dorsal fin extending backwards from the head ; and the posture of the animal compared with that of the accompanying fishes corresponds exactly with that of the other specimen. The whole aspect of the thing suggests the hypothesis that this is really an exceedingly early stage of some Labyrinthodont, perhaps of the very one previously described.

---

Mr. Riches, and Mr. G. Kyngdon were p

---

Mr. T. S. Rigg was elected a Member c

---

The President announced that the next I  
arranged for Saturday, April 23rd. Membe  
Redfern Railway Station, to proceed by the 7.  
National Park.

---

#### DONATIONS.

“Mines and Minerals.” By S. H. Cox, [ ]  
F. Ratte. *From F. Ratte, Esq.*

“The Australasian Journal of Pharmacy.”  
Feb. 1887. *From the Editor.*

“Proceedings of the Cambridge Philosophical  
Part 6, 1886. *From the Society.*

“The Transactions of the Entomological Soc  
the year 1886.” Part 4, Dec. 1886. *From th*

“Zoologischer Anzeiger” Y T. 1886. 27

"Report from the Trustees of the Sydney Free Public Library for 1885-6." *From the Trustees.*

"Oology of Australian Birds." Supplement, Part 3. By A. J. Campbell. *From the Author.*

"A Catalogue of the Marine Polyzoa of Victoria." By Dr. P. H. MacGillivray. *From the Author.*

"Bulletin de la Société Belge de Microscopie." 13me. Année. No. 2. *From the Society.*

"Abstract of Proceedings of the Zoological Society of London." Jan. 18th, 1887. *From the Society.*

"Memoirs of the Geological Survey of India—Palæontologia Indica." Ser. I., Vol. I., Part 1; Ser. x., Vol. III., Parts 7 and 8. Vol. IV., Part 1 and Supplement; Ser. xii., Vol. IV., Part 2; Ser. xiii., Vol. I., Part 6; Title Page and Contents of Vol. I. of Ser. vii. and xiv.; "Records of the Geological Survey of India." Vol. XX., Part 1, 1887; "Catalogue of the Remains of Siwalik Vertebrata contained in the Geological Department of the Indian Museum, Calcutta." Part 1, Mammalia. Part 2, Aves, Reptilia and Pisces. By R. Lydekker, B.A., F.G.S., &c.; "Catalogue of the Remains of Pleistocene and Pre-Historic Vertebrata, contained &c." By R. Lydekker, B.A., F.G.S., &c. *From the Director of the Geological Survey of India.*

"Revue Coloniale Internationale." Tome IV., No. 2, Feb. 1887. *From L'Association Coloniale Néerlandaise à Amsterdam.*

"The Victorian Naturalist." Vol. III., No. 11, March 1887. *From the Field Naturalists' Club of Victoria.*

"The Journal of the Cincinnati Society of Natural History." Vol. IX., No. 4, Jan. 1887. *From the Society.*

"Bulletin of the American Geographical Society." No. 2, 1886. *From the Society.*

February. *From the Society.*

“Entomologisk Tidskrift,” Arg. VII., 18  
*mological Society in Stockholm.*

“Report of the Trustees of the Public Li  
National Gallery of Victoria for 1885.” *Fre*

# PAPERS READ.

## NOTES ON THE BACTERIOLOGICAL EXAMINATION OF WATER FROM THE SYDNEY SUPPLY. No. III.

BY DR. OSCAR KATZ.

During the time from 30th December, 1886, till 17th March, 1887, I was able to carry out seventeen bacteriological examinations of Sydney Water, which was in all the cases derived from the tap in the Laboratory of the Linnean Hall. The results of these different tests, as regards the quantity of bacteria in the water under consideration, can best be seen from the following table :—

Date.	Temp. of Water.	Number of colonies in 1 ccm.	Number of liquefying colonies in 1 ccm.
(1) Dec. 30, '86	76° F. = 24 $\frac{4}{9}$ ° C.	177	62 = 35 p.c.
(2) Jan. 4, '87	77 F. = 25 C.	32	18 = 56 $\frac{1}{4}$ p.c.
(3) „ 10	79 F. = 26 $\frac{1}{9}$ C.	159	88 = 55 $\frac{1}{3}$ p.c.
(4) „ 17	73 F. = 22 $\frac{7}{9}$ C.	9	2 = 22 $\frac{2}{3}$ p.c.
(5) „ 20	74 F. = 23 $\frac{1}{3}$ C.	11	5 = 45 $\frac{5}{11}$ p.c.
(6) „ 25	76 F. = 24 $\frac{4}{9}$ C.	31	7 = 22 $\frac{2}{3}$ p.c.
(7) „ 31	79 F. = 26 $\frac{1}{9}$ C.	434	212 = 48 $\frac{7}{10}$ p.c.
(8) Feb. 3	74 F. = 23 $\frac{1}{3}$ C.	26	10 = 38 $\frac{5}{13}$ p.c.
(9) „ 8	74 F. = 23 $\frac{1}{3}$ C.	417	194 = 46 $\frac{1}{2}$ p.c.
(10) „ 13	75 F. = 23 $\frac{8}{9}$ C.	195	125 = 64 $\frac{1}{10}$ p.c.
(11) „ 18	73 F. = 22 $\frac{7}{9}$ C.	37	8 = 21 $\frac{2}{3}$ p.c.
(12) „ 22	71·5F. = 22 C.	369	172 = 46 $\frac{8}{13}$ p.c.
(13) „ 26	73·5F. = 23 C.	21	6 = 28 $\frac{4}{7}$ p.c.
(14) Mar. 2	76 F. = 24 $\frac{4}{9}$ C.	164	80 = 48 $\frac{4}{9}$ p.c.
(15) „ 7	75·5F. = 24 $\frac{1}{6}$ C.	188	72 = 38 $\frac{2}{7}$ p.c.
(16) „ 11	76 F. = 24 $\frac{4}{9}$ C.	0	0
(17) „ 17	72·5F. = 22 $\frac{1}{2}$ C.	528	204 = 38 $\frac{7}{11}$ p.c.



...the group of the so-called "water-  
from others by their power of multiplying  
traces of organic matter can chemically be :

From the above it may be seen that th  
bacterial colonies, namely 165, for the pe  
lower than that obtained previously (cf. tl  
series, Vol. I. 1886, pp. 913, 1205), and thi  
ing as the temperatures of the water for  
course, considerably higher than those  
occasions (l.c.).

CONTRIBUTIONS TOWARDS A KNOWLEDGE OF THE  
COLEOPTERA OF AUSTRALIA.

BY A. SIDNEY OLLIFF, F.E.S.,  
ASSISTANT ZOOLOGIST, AUSTRALIAN MUSEUM.

No. IV.—DESCRIPTION OF A NEW GENUS AND SPECIES OF  
*OEDEMERIDÆ*.

The genus which I here describe is remarkable among the whole of the heteromorous Coleoptera for the peculiar construction of its antennæ. It is allied to *Nacerdes* and *Ananca*, but differs from them, as it does from every other member of the family *Oedemeridæ* known to me, in having certain joints of its antennæ enormously dilated and the metasternum produced into two sharp spines posteriorly. The structure of the antennæ is fully described below, but I would draw particular attention to the form of the seventh joint which is quite unlike anything I have observed before. In shape it is pyriform, cup-like, and of considerable depth ; but whether this structure is sexual or not is a question which cannot be determined at present.

Unfortunately I have not been able to examine the mouth-organs and sexual characters as carefully as I could wish as I have only a single exponent of the species, which I captured, together with some new and interesting Clavicorns, at Longford, Tasmania, during January 1886, on the flowers of *Leptospermum*.

ITHACA, gen. nov.

Body elongate, finely pubescent. Head moderately large, transverse, broadly but not very deeply depressed between the eyes. Mentum transverse, narrowed behind, very feebly emarginate in front. Maxillary palpi 4-jointed, rather robust, the

shaped, rounded behind and truncate in front, the 7th shorter and narrower, slightly dilated externally, 10th and 11th cylindrical, the latter as the former. Prothorax longer than broad, the sides rounded in front. Scutellum elongate. Elytra elongate, parallel, rounded behind, emarginate behind, with a sharp spine on each emargination projecting over the posterior coxae. Abdomen 10 visible segments, the last segment bilobed, with two apical spines; the anterior and intermediate joints 4-jointed, the posterior tarsi 4-jointed; the penultimate tarsi strongly bilobed; claws very slightly

**ITHACA ANTBINA, sp. n.**

Elongate, parallel, dark fuscous, somewhat closely covered with fine grey pubescence; prolegs pale testaceous, head, first two, and the 5th and 6th segments of the antennae pitchy black; the 3rd, 4th, 7th (and 8th) segments of the antennae and the dilated portions of the 8th and 9th segments testaceous.

Head transverse, closely, irregularly and punctured, broadly depressed in the middle, and in front of the antennae; mandibles, ex-

fuscous spot near the anterior margin on each side of the middle ; anterior angles strongly rounded ; the sides slightly constricted behind the middle. Scutellum finely and not very closely punctured. Elytra more than twice as long as the head and prothorax together, closely and moderately strongly rugulose-punctate ; each elytron with three obscure costæ ; the external apical angles obtuse ; the internal angles rounded. Underside rather finely and closely punctured ; the prosternum testaceous ; the mesosternum, metasternum, and abdominal segments dark fuscous with a steel-blue tinge ; the metasternum thickly clothed with long grey pubescence at the sides, the space between the posterior processes without pubescence and finely aciculate. Legs moderately long ; the anterior pair testaceous with the bases of the femora and the tips of the tibiæ fuscous ; the intermediate and posterior pairs fuscous with the knees and the tips of the tibiæ dark reddish testaceous. Length  $9\frac{1}{2}$  mm.

Longford, Tasmania.

A single specimen captured settling on the flowers of *Leptospermum*. Except for its antennæ this remarkable species has the *facies* of the *Telephoridæ*, but its heteromerous tarsi and spined metasternum are characters which at once distinguish it from the *Malacoderms*.

BY PROFESSOR STEPHENS, M.A

The fossils which Mr. Wilkinson, Government Geologist, collected at Gosford, in the beds from which the *Platycephalus* described in the last Volume of Proceedings was brought to Sydney at the beginning of this year.

The collection contains hundreds of specimens of various genera and families, among which is a possible *Belonostomus* of all sizes, *Cleithrolepis*, &c., all of which are at present quite unknown to me. They are chiefly Ganoids, and many quite new, at least to Australia. Some have been much broken in the quarry, others in the museum, but all were otherwise in a wonderful state of preservation. They had evidently been all killed at the same moment and buried. Some are quite straight and in the others convulsed and distorted. One large specimen has the right pectoral fin thrown up on the same side as the underside of the head and fore quarter of the rest of the body presented, showing both that the fin was cartilaginous, and that the fish died suddenly. Many others are twisted and bent double in various ways, which corroborate the speculation, advanced in the last Volume, that they were killed by a sudden influx of muddy water into the tepid lagoon where they lived. There are also with them beautifully preserved

which gives an imperfect head, with some of the details in a good state. Example No. 1 is a little over a foot in length, broken off at the tail end, and apparently made up to some extent about the snout. For the collector, afraid that the soft and perishable nature of the stone might lead to the obliteration of important details, has applied a kind of black japan to the surface, doing no harm in some cases, but in others, as in this, quite destroying the outlines, which very probably were originally faint, or perhaps injured in the quarry. This renders the measurements from the snout doubtful, though they cannot be far out. The orbits are very distinct, and show that the fossil has been a little distorted by downward and forward pressure from the right, lying as they do to the other side of their true position, and with the right orbit a little in advance of and rounder than the left. The post orbital bones are in good relief, ending in acute angles towards the back of the head. A flattish medial depression in the parietals seems to indicate the place of the foramen, which may probably be determined by careful use of the knife, but which I cannot at present distinguish. The super-occipital is completely ossified, extending as far back as the anterior portion of the thoracic plates, and closing the intervening space shown in Vol. XI. pl. xxii. of our Proceedings. The quadrato-jugals are prolonged far to the rear of their position in the younger specimen, (*ibid.* p. 1182), and the branchial arches (*if present*) are obscurely indicated between these backward processes and the clavicular plates. The vertebral column is represented by an indistinct ridge extending about half-way down the whole length of the fossil, and pushed a little towards the left. I can see no traces of ribs, limbs, nor of any structure more than has been mentioned, except that the dermal covering of the head seems to be preserved, presenting an irregularly pitted or granulated surface, the 'grain' averaging about 1mm. across. As in the former example, it is the inner or upper surface of the thoracic plates that is presented, and the outer or upper surface of the head.

It is curious that both this and the former specimen should have fared alike in this respect. Both of them preserve and expose the upper surface of the head, and both have lost all the structures overlying the Thoracic plates. The preservation of the head is no doubt owing to its more perfect ossification; and the

... of the upper surface of  
 paint with which it has been covered ren-  
 certain upon this point. Radiating sculpt  
 of four of the bones, but their sutures are  
 They may perhaps be the Maxillaries and I

The principal measurements are as follow

#### DIMENSIONS OF HEAD.

##### No. 1.

Length.....	Uncertain ; perh. about 65 mm.
Breadth ..	Ditto, ditto 55
Distance of orbit from base of skull.....	15
Least width of interorbital space .....	10
Length of orbit.....	13.5
Width .....	12
Distance of parietal foramen from base of skull.....	12?
From centre of occiput to posterior end of orbit.....	21
From tip of snout to anterior end of orbit.....	37

#### THORACIC PLATES. No. 1 ON

Medial. Length.....	
Greatest breadth .....	
Centre of radiating sculpture in advance of greatest	
Length of each anterior margin .....	
Length of each posterior margin .....	
Laterals. Length from exterior angle (centre of anterior margin.....	
Transverse breadth of the whole set from angle to s	

It is not absolutely certain that these two  
 same species

ADDITIONAL EVIDENCE ON FOSSIL SALISBURLÆ  
FROM AUSTRALIA.

BY F. RATTE, M.E.

*Jeanpaulia* (?) *palmata*, Ratte, Proc. Linn. Soc. N.S.W., Vol. I. (ser. 2), p. 1078; *Salisburia palmata*, Ratte, *emend.* from *Jeanpaulia* or *Baiera palmata*, Ibid. Vol. II. (ser. 2), p. 137.

After the last meeting of the Society, when I suggested that the large palmate leaf found in the shale of the Wianamatta-Hawkesbury formation, should be referred to the genus *Salisburia*, I unexpectedly found in the French weekly paper "La Nature," an interesting contribution on the subject, by Marquis G. de Saporta.

From that paper and the woodcuts given, I find that this author, and also Professor Heer of Zurich, give the name of *Salisburia* to a number of plants with coriaceous and persistent leaves, which, for the sake of giving a brief outline of their characters and distribution, I will enumerate as follows :—

	LOCALITY.	JURASSIC.	CRETACEOUS.
a. Leaf entire, rhomboidal (transversally). SALISBURIA ANTARCTICA. Sap.....	Australia...	Lower Lias ?	.....
b. Leaf entire, reniform. SALISBURIA PRIMORDIALIS. Hr.....	S. Greenland	.....	Chalk
c. Leaf fan-shaped, with only a few incisions. SALISBURIA INTEGRIUSCULA. Hr....	Cape Bohe- man (Spitz- berg)	Jurassic	.....



	Bohemian
e. <i>Leaf distinctly divided into two principal symmetrical segments, more or less sinuated.</i> SALISBURIA HUTTONI (Sternbg.) Hr. S. PSEUDO-HUTTONI (Hr.) Sap.....	Scarborough Kajamündung (East Siberia)
f. <i>Leaf palmate ; divisions numerous, deep, oval, rather broad ; secondary sinuations not very deep. Apices rounded or rather acute (S. Schmidtiana).</i> SALISBURIA PLURIPARTITA. Schimp. S. ARCTICA. Hr. .... S. SCHMIDTIANA. Hr... ..	Westphalia S. Greenland East Siberia
g. <i>Leaf palmate ; divisions numerous, deep, oval, elongate ; secondary divisions deep. Apices rather more acute than rounded.</i> SALISBURIA FLABELLATA. Hr..... S. LEPIDA. Hr.....	East Siberia East Siberia
h. <i>Leaf palmate ; divisions numerous, digitiform, broad, rounded at the apex.</i> SALISBURIA SIBIRICA. Hr..... S. SIBIRICA var. PUSILLA (Hr.) Sap.	East Siberia East Siberia
k. <i>Leaf palmate ; divisions numerous, digitiform, narrow. Apex rounded</i> SALISBURIA CONCINNA. Hr.....	East Siberia

The last tree of

(*Phœnicopsis*, *Trichopitys*, and *Czekanowskia*), allied to *Salisburia*, about which I have no literature at hand; and Marquis de Saporta, in the above-mentioned contribution, (1) even doubts whether *Salisburia concinna* of Professor Heer, is really a *Ginkgo*, as its resemblance with the genus *Baiera*, might, according to this author, be due to a recurrence of form appearing in distinct and parallel groups, originally issued from a common ancestral stock.

I will not follow the author in his sketch of the affinities and migrations of the different species; I will simply quote, without translating, any paragraph dealing with the Australian fossil, *Salisburia antarctica*, or tracing the genus further back than our triassic species.

At the same time, as a matter of reference, it will not probably be out of place to mention that Mr. Feistmantel has described three species from the Gondwana series (Foss. Flora Gondwana, Vol. IV. p. 49, pl. III. &c.)

Now, from Marquis de Saporta, I give the following extracts:

“Un fait singulier est venu dévoiler récemment l'existence à l'autre extrémité du globe, sur le sol australien, d'un quatrième point alors habité par le même genre *Salisburia*. Le moment précis de cette colonisation, indice d'une très-vaste diffusion antérieure due à la grande longévité du type, ce moment doit être rapporté au lias ou même au lias inférieur. On voit par là qu'à l'exemple des *Araucaria* dans le passé et conformément à ce que le hêtre (*fagus*) nous laisse voir maintenant, les *Salisburia* étaient répandus à la fois dans les deux hémisphères, vers le milieu des temps secondaires, et qu'ils s'étendaient au-delà du tropique du Capricorne, aussi bien qu'à l'intérieur du cercle polaire arctique.” (Loc. cit. p. 157.)

And further:—

“L'Australie a fourni une seule espèce, que nous nommerons *Salisburia antarctica*.” (Loc. cit. p. 203.)

This Australian species thus, it appears, comes back to us indirectly, and is still unpublished at the time de Saporta writes;

---

(1) G. de Saporta. Les Variations morphologiques d'un type de Plantes. “La Nature” 26 Août 1882, p. 203.

Eury in the Middle Permian of Jelovica  
in the Urals; about which discovery he says:

“Jusqu’ici les Gingkos ne dépassaient la  
direction du passé (in the past). En Europe  
(Brauns) Nath., et, en Australie, le *Salix*  
espèce encore inédite, marquaient les dernières  
qui aient été signalés.” [Sur quelques types  
ment observés à l’état fossile. M. G. C.  
Rendus Acad. Sciences, 1r. Semestre, 1882.]

Before ending this note I beg leave to point  
for our geological record, of ascertaining the  
*Salisburia antarctica*, Sap. comes. Some  
found in Rev. T. Woods’s elaborate paper on  
Australia,” as he places the Burnett River  
*Jeanpaulia (Baiera) bidens*, T. Woods,  
Infralias or Lower Lias (?) with a query.

BY E. PIERSON RAMSAY, F.R.S.E., &C., AND J. DOUGLAS-OGILBY.

Form rounded, moderately tapering. Snout of moderate length, obtuse, thickly studded with minute pores. Eyes rather nearer to the end of the snout than to the anterior gill-opening. Cleft of mouth deep, its gape wide. A short, but deep groove behind the angle of the mouth. Nostrils obliquely transverse, much nearer to the mouth than to the tip of the snout. Teeth in both jaws serrated, in the upper oblique with the base swollen; erect and smaller in the lower jaw. First dorsal fin situated much nearer to the tip of the snout than to the base of the caudal, and closer to the end of the base of the pectoral than to the origin of the ventral: second dorsal one-third of the size of the first; the space between the dorsal fins being rather more than one-third of the distance between the end of the second and the base of the caudal: pectorals large and falciform, reaching to beneath the end of the first dorsal, its inner lobe two-ninths of the end of the outer. Ventrals small with the lower margin truncate. Caudal with basal pit above and below, its upper lobe one-fourth of the total length, and notched near the extremity. Skin rough. *Colors*—above plumbeous, below white; tips of second dorsal, lower caudal lobe, and pectorals, black.

Total length	...	...	...	...	...	...	34 $\frac{3}{8}$ in.
Depth at origin of first dorsal fin				...	...	...	4 $\frac{1}{8}$
Depth at root of caudal fin			...	...	...	...	1 $\frac{1}{4}$
Circumference of body	...	...	...	...	...	...	14
Breadth of body	...	..	...	...	...	...	4 $\frac{3}{4}$

	... tip of snout and nostril, 1			
Distance between tip of snout and eye, near				
Distance between nostril and mouth	...			
Distance between outer angles of nostrils				
Distance between eye and first gill-opening				
Width of mouth	...	...	...	...
Depth of mouth	...	...	...	...
Origin of first dorsal to the end of the base of				
End of first dorsal to the origin of ventral				
Outer edge of pectoral	...	...	...	
Inner edge of pectoral	...	...	...	
Intradorsal space	...	...	...	...
Diameter of eye	...	...	...	...
Length of longest gill-opening		...	...	

This Shark is said to be not uncommon on the West Coast, where it is called the "Whaler," and is often confounded with Dr. Günther's *Carcharias brachycephalus*, but however it may be recognised at a glance by the shape of the snout and the obtuseness of the snout. Type specimen in the British Museum, I. 1155.

**LIST OF BIRDS COLLECTED AT DERBY, NORTH WEST  
AUSTRALIA, BY THE LATE T. H. BOYER-BOWER,  
Esq., WITH NOTES.**

BY DR. E. P. RAMSAY, F.R.S.E., &c., &c.

*(Continued from Vol. I. (2nd ser.) p. 1100.)*

**1. GYPOICTINIA MELANOSTERNON, Gould.**

One specimen similar to the eastern form of this species.

**2. FALCO LUNULATUS, Latham.**

*(Falco frontatus, Gould).*

One specimen is a rich slate-blue on the upper surface, and below has a deeper orange rufous tint than I have observed in any of the N.S. Wales examples.

**3. CIRCUS ASSIMILIS, Jard. & Selb.**

*(Circus jardinii, Gould).*

**4. CIRCUS GOULDII, Bonp.**

*(Circus assimilis, Gould).*

**5. ASTUR APPROXIMANS, Vig. & Horsf.**

Quite similar to the N. S. Wales examples.

**6. ASTUR CRUENTUS, Gould.**

These are the first examples I have seen of this species, which is undoubtedly a very distinct form from *A. approximans*; in plumage it closely resembles *Accipiter cirrhocephalus*.

Total length male 13·5 in., wing 9·3 in., tail 7 in., tarsus 2·7 in.; first joint of mid-toe 0·55 in. Female 15·5 in., wing 10 in., tail 8·5 in., tarsus 2·9 in.; first joint of mid-toe 0·7 in.

10. MILVUS AFFINIS, *Gould.*
11. FALCO MELANOGENYS, *Gould.*
12. HIERACIDEA OCCIDENTALIS, *Go*
13. HIERACIDEA ORIENTALIS, *Schl.*  
(*H. berigora*, Gray).
14. TINNUNCULUS CENCHROIDES, *Vig*
15. PANDION LEUCOCEPHALUS, *Gould*
16. STRIX DELICATULA, *Gould.*
17. NINOX CONNIVENS-OCCIDENTALIS,  
See P.L.S. N.S.W., Vol. I. (second series)
18. ÆGOTHELES LEUCOGASTER, *Gould*  
This bird is very variable in its tints of  
the upper surface.
19. PODARGUS GOULDII, *Masters.*  
*Ramsay*, P.L.S. N.S.W., Vol. I. (2nd series)
20. EUROSTOPODUS GUTTATUS, *Vig. &*  
*Ramsay*, P.L.S. N.S.W., Vol. I. (2nd series)
21. MEROPS ORNATUS, *Lath.*
22. EURYSTOMUS PACIFICUS, *Lath.*
23. DACELO CERVINA, *Gould.*
24. HALCYON MACLEAYI, *Jard. & Sel*
25. HALCYON

26. ARTAMUS CINEREUS, *Vieill.*
27. CRACTICUS PICATUS, *Gould.*
28. CRACTICUS ROBUSTUS, *Lath.*  
(*C. nigrogularis*, *Gould.*)
29. GRAUCALUS MELANOPS, *Lath.*
30. ARTAMUS MINOR, *Vieill.*
31. ARTAMUS LEUCOPYGIALIS, *Gould.*
32. PARDALOTUS UROPYGIALIS, *Gould.*
33. CRACTICUS TORQUATUS, *Lath.*  
(*Barita destructor*, *Temm.*)
34. CAMPEPHAGA TRICOLOR, *Swains.*
35. PACHYCEPHALA FALCATA, *Gould.*
36. COLLYRIOCINCLA BRUNNEA, *Gould.*
37. COLLYRIOCINCLA RUFIGASTER, *Gould.*
38. RHIPIDURA PREISSI, *Cab.*
39. RHIPIDURA SETOSA, *Quoy et Gaim.*
40. SAULOPROCTA PICATA, *Gould.*
41. SEISURA NANA, *Gould.*
42. MYIAGRA CONCINNA, *Gould.*
43. MYIAGRA LATIROSTRIS, *Gould.*

The one specimen obtained appears to be Gould's *M. latirostris*, but may hereafter prove to be only a female of *M. concinna*.

44. GERYGONE ALBOGULARIS, *Gould.*

*Ramsay*, l.c. p. 1098.

45. SMICRORNIS FLAVESCENS, *Gould.*
46. PETRŒCA PICATA, *Gould.*
47. PÆCILODRYAS CERVINIVENTRIS, *Gould.*

Notwithstanding that several specimens were obtained, this bird does not appear to be common anywhere. *Ramsay*, l.c. p. 1089.



During the first year the young males re  
plumage with the exception of the ear-cove

50. MALURUS LAMBERTI, *Lath.*

These appear to be identical with the Ne

51. CISTICOLA RUFICEPS, *Gould.*

52. CISTICOLA SP. (? C. LINEOCAPILL

53. EPHTHIANURA CROCEA, *Castl. & .*

This species extends as far eastwards as the  
where it was originally obtained by Mr.  
travels in that district.

54. CINCLORAMPHUS CRURALIS, *Vig. &*

55. CINCLORAMPHUS CANTILLANS, *Gou*

See previous remarks on these species. *Ra*

56. PTENÆDUS RUFESCENS, *Vig. and I*

57. MIRAFRA HORSFIELDII, *Gould.*

58. CALAMOHERPE LONGIROSTRIS, *Gou*

59. ESTRILDA BICHENOVII, *Vig. & Hor*

60. ESTRILDA ANNULOSA, *Gould.*

61. ESTRILDA CASTANOTIS, *Gould.*

62. ESTRILDA RUFICAUDA *Castl.*

65. *POEPHILA ACUTICAUDA*, *Gould*.

Plentiful, many live specimens being also obtained.

66. *POEPHILA GOULDIAE*, *Gould*.

67. *POEPHILA MIRABILIS*, *Homb. & Jacq.*

See previous remarks, l.c. p. 1091.

68. *CHLAMYDODERA NUCHALIS*, *Jard. & Selb.*

Females only obtained.

69. *POMATOSTOMUS RUBECULUS*, *Gould*.

70. *STIGMATOPS SUBOCULARIS*, *Gould*.

71. *SITIGMATOPS OCULARIS*, *Gould*.

72. *PTILOTIS VITTATA*, *Cuv.*

73. *PTILOTIS FLAVESCENS*, *Gould*.

74. *PTILOTIS NOTATA*, *Gould*.

75. *STOMIOPERA UNICOLOR*, *Gould*.

This bird was originally obtained at Port Essington ; it has a wide range extending over the whole of the north, and north-western portions of the Continent.

76. *ENTOMOPHILA ALBOGULARIS*, *Gould*.

77. *ENTOMOPHILA RUFOGULARIS*, *Gould*.

78. *PHILEMON ARGENTICEPS*, *Gould*.

79. *PHILEMON*, *juv. (sp. ?)*

80. *MYZOMELA PECTORALIS*, *Gould*.

81. *MELITHREPTUS ALBOGULARIS*, *Gould*.

82. *MELITHREPTUS LÆTIO*, *Gould*.

83. *MYZANTHA LUTEA*, *Gould*.

84. *DICÆUM HIRUNDINACEUM*, *Shaw*.

Universally dispersed over the whole Continent.

85. *CLIMACTERIS MELANURA*, *Gould*.

89. CUCULUS FLABELLIFORMIS, *Lath.*
90. MESOCALIUS PALLIOLATUS, *Lath.*  
(*Chalcites osculans*, Gould).
91. CHALCITES BASALIS, *Horsf.*
92. CHALCITES MINUTILLUS, *Gould.*
93. EUDYNAMIS CYANOCEPHALA, *Lath.*  
(*E. flindersi*, Gould).
94. CENTROPUS MELANURUS, *Gould.*  
Probably only a variety of *C. phasianus*, *La*
95. CACATUA GYMNOPIA, *Sclater.*
96. CACATUA ROSEICAPILLA, *Vieill.*
97. CALYPTORHYNCHUS STELLATUS, *Wag*  
(*C. macrorhynchus*, Gould).
98. CALYPTORHYNCHUS NASO, *Gould.*
99. CALOPSITTACUS NOVÆ HOLLANDIÆ, *La*
100. *La*

103. PHAPS HISTRIONICA, *Gould.*

104. LOPOPHAPS FERRUGINA, *Gould.*

This bird was found in immense numbers during the month of October, 1886.

105. OCYPHAPS LOPHOTES, *Temm.*

106. PHAPS CHALCOPTERA, *Lath.*

107. GEOPELIA HUMERALIS, *Temm.*

108. GEOPELIA PLACIDA, *Gould.*

109. STICTOPELIA CUNEATA, *Lath.*

110. SYNOICUS AUSTRALIS, *Lath.*

111. HEMIPODIUS VELOX, *Gould.*

112. ŒDICNEMUS GRALLARIUS, *Lath.*

113. LOBIVANELUS MILES, *Bodd.*

114. ÆGIALITIS GEOFFROYI, *Wagler.*  
(*Hiaticula inornata*, *Gould*).

115. ÆGIALITIS NIGRIFRONS, *Cuv.*

116. ERYTHROGONYS CINCTUS, *Gould.*

117. ACTITIS EMPUSA, *Gould.*

118. SCHŒNICLUS ALBESCENS, *Temm.*

119. LIMNOCINCLA ACUMINATA, *Horsf.*

120. GLAREOLA GRALLARIA, *Temm.*

121. TOTANUS SP.

122. RECURVIROSTRA RUBRICOLLIS, *Temm.*

127. THRESKIORNIS STRICTIPENNIS, *Lath.*
128. PLATALEA REGIA, *Gould.*
129. XENORHYNCHUS AUSTRALIS, *Lat.*
130. ARDEA PACIFICA, *Lath.*
131. ARDEA NOVÆ-HOLLANDIÆ, *Lath.*
132. HERODIAS ALBA, *Linn.*
133. HERODIAS MELANOPUS, *Wagl.*  
(*A. garzetta*, *Linn.*)
134. HERODIAS INTERMEDIA, *V. Hassel.*  
(*H. plumiferus*, *Gould.*)
135. NYCTICORAX CALEDONICUS, *Lath.*
136. BUTOROIDES FLAVICOLLIS, *Lath.*
137. PORPHYRIO BELLUS, *Gould.*
138. TRIBONYX VENTRALIS, *Gould.*
139. FULICA AUSTRALIS, *Gould.*

These birds should be common in

141. ANAS CASTANEA, *Eyton*.
142. CHLAMYDOCHEN JUBATA, *Lath.*
143. NETTAPUS PULCHELLUS, *Gould.*
144. DENDROCYGNA VAGANS, *Eyton.*
145. MALACORHYNCHUS MEMBRANACEUS, *Lath.*
146. PODICEPS GULARIS, *Gould.*
147. PODICEPS AUSTRALIS, *Gould.*
148. STERNA ANGLICA, *Mont.*  
(*Gelohelidon macrotarsa*, *Gould*).
149. STERNA FRONTALIS, *Gray.*  
(*Sterna melanorhyncha*, *Gould*).
150. PLOTUS NOVÆ HOLLANDIÆ, *Gould.*
151. GRACULUS MELANOLEUCUS, *Vieill.*
152. GRACULUS STICTOCEPHALUS, *Bp.*

Mr. Harrison exhibited a selection from  
of Fossils, now amounting to about 400 sp  
number of new and remarkable forms of F  
out the importance of the evidence which is  
favour of the view that the Hawkesbury for  
age.

Dr. Ramsay exhibited (1.) An Egg of 1  
*Lopholaimus antarcticus*, (Shaw), taken fro  
McLennan. The egg is nearly perfectly ova  
pointed at the thin end, white, and witho  
1.85 × 1.25 inches ; (2.) Some very old dic  
used by the Aborigines of the Lachlan distr  
obtained by Mr. K. H. Bennett of Mossiel ;  
by the Aborigines of Tasmania ; (4.) Slabs  
Ferns (*Rhacopteris*, &c.), from near Stroud, N

Mr. Palmer exhibited six silk egg-bags mad  
(species uncertain) at different times, and atta

Mr. Masters exhibited a living specimen of c  
Lizards" *Cyclodus nigro-luteus*, Q. and G., sei  
from Mt. Wilson—a species which is rare s  
common in Victoria and Tasmania.

Mr. Steel exhibited a specimen of *Bomb*  
overgrown by a fungus, springing from all par

Mr. Ogilby exhibited a living examnle of

Mr. Maiden exhibited a collection of *Leguminosæ* indigenous in New South Wales, comprising 25 genera and 75 species. Of the plants collected in the immediate neighbourhood of Sydney may be mentioned *Acacia hispidula*, *A. lunata*, *A. decurrens*, *A. oxycedrus*, *Aotus lanigera*, *Zornia diphylla*, and some interesting species of *Pultenæa* and *Oxylobium*. Some of the rarer *Acacias* from the Western Districts were also exhibited, together with some rare species of *Pultenæa*, *Bossiaea*, *Oxylobium*, &c., collected near the Victorian border, by Mr. Bauerlen. Each species was mounted on cardboard and full particulars given. Also plants of *Myriogyne minuta*, Less., a composite plant with numerous synonyms, and known in the Southern Districts as "Sneezeweed." Dr. Woolls, a few months ago, drew attention to this plant as a remedy in ophthalmia. Mr. Maiden said he would be able to give specimens of the herb to those who desired to test its properties in the direction indicated.

Mr. Fletcher exhibited for Mr. A. G. Hamilton, of Guntawang, a large and remarkable frog, at present undetermined, recently captured by his son Charles, at Hartley, Blue Mountains, where it was found buried in the sand in the bed of a creek. It differs from any Australian frog at present described, by having a row of spines on the dorsal surface of each of the first three fingers, the seventh and last spine on the first finger of each hand being conspicuously larger and more formidable than the others.

At the close of the regular business the President drew the attention of Members to a communication received from Baron v. Mueller, in which, referring to the interesting Botanical discoveries made by Messrs. W. Sayer and A. Davidson on Mount Bellenden Ker, he suggests that the Society, or Members of the Society, should make an exploration of Mount Sea-view; stating further that he had himself as far back as 1859 sent Dr. Beckler into the Hastings River district for that purpose. This attempt proved ineffectual owing to the absence of settlement in the neighbourhood. The Council of the Society, though not able to take action at once in the matter, applied to the best authorities for information. At



the New England Range. He is not a  
River mountain has ever been ascended,  
that the attempt should be made except by  
bushmen. It was not likely that any effort  
be made during this autumn, especially at  
rainfall as we have had. But all information  
would be thankfully received.

WEDNESDAY, 27<sup>TH</sup> APRIL, 1887.

---

The President, Professor W. J. Stephens, M.A., F.G.S., in the Chair.

---

Mr. F. H. Thatcher, and Mr. Duncan Anderson were present as visitors.

---

MEMBERS ELECTED.

The following gentlemen were elected Members of the Society :—  
Mr. Hugh Dixon ; Rev. W. H. H. Yarrington, West Maitland ;  
Dr. Metcalf, Norfolk Island.

---

The President announced that the next Excursion had been arranged for Saturday, May 14th. Members to meet at the Railway Station, to proceed by the 8.15 a.m. train to Brooklyn, Hawkesbury River Railway Terminus. Steamer and Refreshments will be provided. In order to facilitate arrangements, Members intending to be present are requested to notify the same to the Director by the preceding Thursday.

---

DONATIONS.

"The Quarterly Journal of the Geological Society." Vol. XLIII., Part 1 (1887). *From the Society.*

Bulletin de la Société Belge de Microscopie." 13me. Année, Nos. 3 and 4. *From the Society.*

... Tome XI., No. 2 (1881)  
tischeskago" &c., T. VII. *From the Soci*

"The Victorian Naturalist." Vol. III  
*From the Field Naturalists' Club of Victor*

"Journal of the College of Science, Imper  
Vol. I., Part 1 (1886). *From the Director*

"Bulletin of the American Geographical  
5 (1885). *From the Society.*

"Bulletin of the Brookville Society of Na  
*From the Society.*

"Feuille des Jeunes Naturalistes." No  
*From the Editor.*

"Zoologischer Anzeiger." No. 245 (28t  
*the Editor.*

"Revue Coloniale Internationale." Ton  
1887). *De la part de l'Association Col*  
*Amsterdam.*

"Observations Publiées par L'Institut N  
de la Société des Sciences de Finlande" v

"Archives Néerlandaises des Sciences exactes et naturelles." Tome XXI., liv. 2me. (1886), et 3me. (1887). *De la part de la Société Hollandaise des Sciences à Harlem.*

"Bulletin de la Société Royale de Botanique de Belgique." Tome XXV., fasc. 2 (1886). *From the Society.*

"Abstract of Proceedings of the Zoological Society of London." 15th Feb., 1887. *From the Society.*

"Notarisia Commentarium Phycologicum." Nos. 1-5. *From the Publisher.*

"On the Fossil Mammals of Australia." Part III. By Professor Owen, F.R.S., &c. *From Dr. J. C. Cox, F.L.S., &c.*

"Comptes Rendus des Séances de L'Académie des Sciences, Paris." Tome CIV., Nos. 4-7 (1887). *From the Academy.*

"Annual Report of the Board of Regents of the Smithsonian Institution for the year 1884." Parts 1 and 2. *From the Institution.*

"Verhandlungen der k.-k. zoologisch-botanischen Gesellschaft in Wien." XXXVI. Band (1886). *From the Society.*

"Mittheilungen der Naturforschenden Gesellschaft in Bern." Jahrg. 1885, III. Heft. *From the Society.*

"Bulletin of the California Academy of Sciences." Vol. II., No. 5 (1886). *From the Academy.*

"Proceedings of the Boston Society of Natural History." Vol. XXIII., Part 2 (March, 1884 to Feb., 1886). *From the Society.*

"Bulletin de L'Académie Impériale des Sciences de St. Pétersbourg." Tome XXX., No. 3, T. XXXI., No. 1; "Mémoires." T. XXXIII., Nos. 6-8 (1886), T. XXXIV., Nos. 1-4 (1886). *From the Academy.*

1886." Nos. 5 & 6. *From the Society.*

" Mittheilungen aus der Zoologischen Station  
VII., Heft 1 (1886). *From the Director.*

" Papers and Proceedings of the Royal Society  
the year 1886." *From the Society.*

" Report of the Trustees of the Sydney Fisheries  
1886-87." *From the Trustees.*

" Report of the Auckland Institute and Museum  
*From the Council.*

PAPERS READ.

NOTES ON THE GENERA OF AUSTRALIAN FISHES.

By E. P. RAMSAY, F.R.S.E., &c., AND J. DOUGLAS-OGILBY.

PART I.

(Notes from the Australian Museum).

In the following paper it is our intention to clearly point out the generic distinctions between certain groups of Australian Percoids ; and we wish to call special attention to the fact that, after an exhaustive examination of over fifty examples each of *Lates calcarifer* and *Lates colonorum*, we have arrived at the conclusion that these fishes are generically separable, and we propose therefore the name *Percalates* for the southern temperate form. We have also examined a number of small fishes from the Murray near Deniliquin, belonging to Count Castelnau's genera *Murrayia* and *Riverina*, and are fully in accord with Dr. Klunzinger in considering these names synonymous with *Macquaria*, Cuv. & Val., the characters which caused the Count to separate the fishes from that described by the latter authors, and excellently figured by MM. Lesson and Garnot in the "Voyage of the Coquille" pl. xiv. fig. 1, having doubtless been overlooked by the authors of the "Histoire Naturelle des Poissons"; whilst the presence or absence of an extra spine to the first dorsal, or of a few minute, and probably deciduous, palatine teeth cannot be considered as forming a valid reason for separating generically two species so exactly similar in all other characters as *Murrayia guentheri* and *Riverina fluviatilis*. It is worth mentioning that the Australian Museum possesses Castelnau's types of *Murrayia guentheri* and *Dules (Ctenolates) auratus*, both having been obtained from precisely the same locality as our specimens.

limb; angle and lower limb with patch.  
Teeth villiform on the jaws and vomer; pa  
anterior patch; tongue smooth. One  
notched, with 11 or 12 spines: the an  
moderate, ctenoid, present on the occip  
fins scaly. Pyloric appendages in small nu

## FLOWERING SEASONS OF AUSTRALIAN PLANTS.

BY E. HAVILAND, F.L.S.

NO. 5.—PLANTS FLOWERING IN THE NEIGHBOURHOOD OF SYDNEY  
DURING THE MONTH OF NOVEMBER, IN ADDITION TO THOSE  
ENUMERATED IN FORMER LISTS.

### Violaceæ—

*Hybanthus filiformis.*

### Hypericinesæ—

*Hypericum Japonicum.*

### Rutaceæ—

*Philotheca Reichenbachiana.*

### Geraniaceæ—

*Geranium dissectum.*

### Euphorbiaceæ—

*Poranthera ericifolia.*

### Stackhousiaceæ—

*Stackhousia monogyna.*

### Ficoideæ—

*Mesembryanthemum æqui-  
laterale.*

### Leguminosæ—

*Pultenaea paleacea*

*Desmodium varians.*

### Saxifragæ—

*Ceratopetalum gummiferum*

„ *apetalum*

*Callicoma serratifolia.*

### Haloragææ—

*Haloragis teucroides*

„ *micrantha.*

### Myrtaceæ—

*Kunzea corifolia*

*Melaleuca thymifolia*

„ *nodosa*

„ *linarifolia*

*Backhousia myrtifolia*

*Angophora cordifolia*

*Leptospermum scoparium*

*Bæckea brevifolia*

*Callistemon salignus.*

### Umbelliferæ—

*Actinotus helianthi*

*Apium australe*

„ *prostratum*

*Hydrocotyle hirta.*

### Proteaceæ—

*Telopea speciosissima*

*Persoonia salicina*

„ *ferruginea*

*Conospermum ellipticum*

„ *tenuifolium.*

### Thymeleæ—

*Wickstræmia Indica.*

### Rubiaceæ—

*Psychotria loniceroides*



<i>Stylidium lineare.</i>	<i>Mel</i>
Goodeniaceæ—	Orchidea
<i>Scaevola microcarpa</i>	<i>Lyp</i>
„ <i>hispida</i>	<i>Cyn</i>
<i>Goodenia stelligera.</i>	<i>Thel</i>
Gentianæ—	<i>Dipc</i>
<i>Villarsia reniformis</i>	Liliaceæ—
<i>Erythræa australis.</i>	<i>Dian</i>
Primulaceæ—	<i>Blan</i>
<i>Samolus repens.</i>	<i>Thys</i>
Myrsinæ—	<i>Cæsi</i>
<i>Ægiceras majus.</i>	<i>Geiton</i>
Jasminæ—	<i>Trico</i>
<i>Notelæa longifolia.</i>	Xyridæ—
Asclepiadæ—	<i>Xyris</i>
<i>Marsdenia suaveolens.</i>	Commelynæ
Lentibularinæ—	<i>Comm</i>
<i>Utricularia dichotoma.</i>	Juncaceæ—
	<i>Xerote</i>
	„
	„

## ON AN IMPROVED METHOD OF CULTIVATING MICRO-ORGANISMS ON POTATOES.

BY DR. OSCAR KATZ.

(WITH TWO FIGURES IN WOOD-CUT).

In the first number of the first volume of the "Centralblatt für Bacteriologie und Parasitenkunde," edited by Leuckart, Loeffler, and Uhlworm, Jena (Gustav Fischer), 1887, pp. 26-27, Dr. E. Esmarch writes on the "Preparation of the potato as a culture-medium for micro-organisms." He calls attention to the universally recognised value of the boiled potato as a culture-soil for most vegetable micro-organisms, for the identification of some of which, especially the bacillus of typhoid fever (Eberth-Gaffky), it is, so far as known, an indispensable and the only reliable medium.

The hitherto customary processes of preparing potatoes for this purpose are, as Esmarch rightly states, far from being satisfactory. He, therefore, proposes the following method. One or more small glass-capsules, of the appearance of the usual damp chambers for cultivating fungi, are sterilised by dry heat. A potato is then peeled by means of a common kitchen-knife, and, after having been rinsed under the water-tap, divided by the same knife into slices about 1 cm. thick, which are next adapted to the diameter of the glass-dishes and placed in the same. These potato-slices prepared in the above manner, are then boiled by steam in the steam-steriliser for from  $\frac{3}{4}$  to 1 hour, and are shortly afterwards ready for use.

This process in the preparation of potatoes, and their storage in small glass dishes with over-lapping lids is undoubtedly far superior to the old mode of preparation and preservation.

was principally engaged in making a s  
dejections in cases of typhoid fever, and  
who died of this disease.

I take a number of shallow but spa  
10·5 cm. height by 2·5 cm. diameter, whic  
with a sufficiently deep cotton-wool stop  
sterilised in the usual manner. The prep  
is the same as in Esmarch's process. Th  
of medium-sized, oval-shaped, perfectly  
about 1 cm. thick (*p* in fig. 1, front view; i  
natural size), are now placed, by aid of a c  
the above described test-tubes, to the wi  
made to fit. It is only advantageous if th  
one or some points of their margin on  
glass-tubes, and thus, resting either at the  
little separate from it, they are sufficiently  
vessels. Then comes the steam-steriliser, in  
about 1 hour at 212° F. (100° C.); the  
thoroughly boiled and sterile.

It is evident that in this way we arrive  
which, as regards simplicity in its manipu  
the process of inoculating, and safety in kee  
culture uncontaminated during the course  
observation, shares the same

of these, at an incubation of from 20°-25°C. (68°-77°F.), sufficiently moist for a considerable length of time. At higher

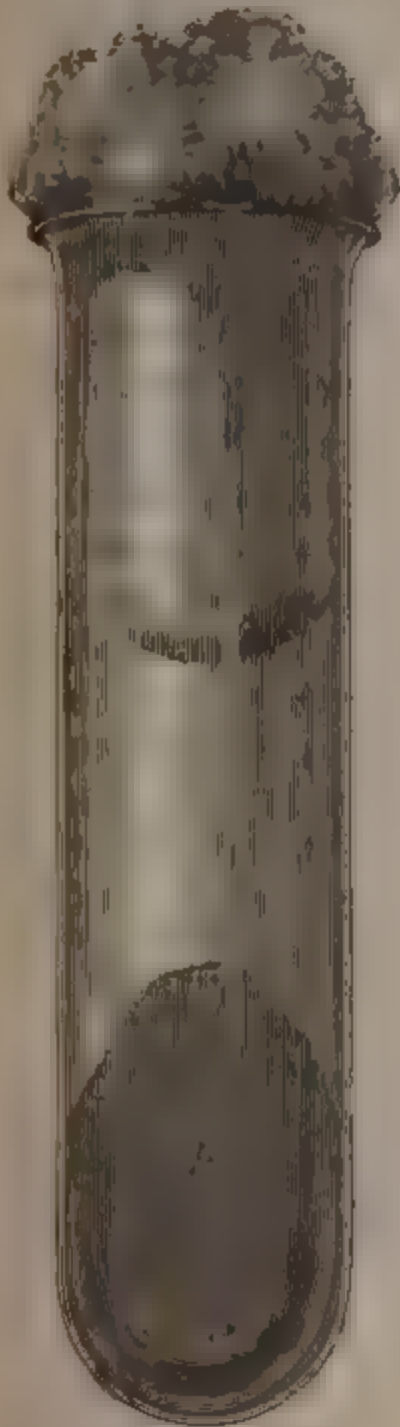


FIG. 1.



FIG. 2.

temperatures up to blood-heat the development of micro-organisms capable of cultivation of boiled potato is so much accelerated that

these are mounted so as to occupy a middle of the test-tubes (p. 189, fig. 2). We can surface either with one and the same medium and the same colony or culture, or we can on the one side one organism, on the other a

The latter mode may sometimes prove of convenience; for instance: in cultivation after Koch, or in test-tubes with gelatin from stools of typhoid fever patients, there are different kinds of non-liquefying colonies with the same rate, exhibit under high powers of magnification different forms, and which it must be desirable to cultivate on potatoes in order to find out which ones are of typhoid fever. In this case, then, we may on one side of the potato-discs a minute quantity of one organism, on the other side, while still holding the glass to the light, a little of another, somewhat different-looking

In conclusion I may add that test-tubes seem also well adapted for the cultivation of bacteria by Esmarch's method (*Zeitsch. f. Hygiene, herausg. von Flügge, Band I., Heft 2, Leipzig, 1886, pp.*

DESCRIPTIVE RECORD OF TWO PLANTS ADDITIONAL  
TO THE FLORA OF AUSTRALIA, AND OCCURRING  
ALSO IN NEW SOUTH WALES,

BY BARON VON MUELLER, K.C.M.G., M.D., F.R.S.

*GENTIANA QUADRIFARIA.*

Blume, Bijdr. 847 (1825).

Annual, minute, glabrous ; stem leafy, very short ; leaves sessile, roundish-ovate, somewhat pointed, very thinly margined ; flowers generally solitary and terminal, sessile or on very short stalks ; calyx cylindric-campanulate, to  $\frac{1}{2}$  or nearly  $\frac{1}{2}$  cleft in 5 or sometimes 4 lobes ; its tube rather pale, membranous, slightly angular ; its lobes ovate, or narrow-semilanceolar-ovate, thinly margined ; corolla twice as long as the calyx, outside greenish, inside blue or white ; its tube gradually widened upwards ; its lobes about half as long as the tube, nearly semilanceolar-ovate, with minute deltoid pointed entire or sometimes bifid lobules intervening ; stamens about as long as the tube of the corolla ; filaments filiform, dilated towards the bases ; anthers erect, narrow-ellipsoid, quite blunt, basifixed ; ovary attenuated into a short style ; fruit membranous, on a rather long stipes, ovate, compressed, at last deeply bivalved ; seeds very minute, pale-brownish, turgid-ovate ; testa subtle-streaked.

In the vicinity of the Genoa (W. Baeuerlen).

Height of whole plant, according to Australian specimens, 3 inches. Leaves  $\frac{1}{8}$ – $\frac{1}{3}$  inch long. Bracteoles none. Flowers  $\frac{1}{4}$  to hardly  $\frac{1}{2}$  inch long ; the lobule from each sinus of the corolla usually much shorter than the lobes, but sometimes fully half as long. Stamens adnate to the lower portion of the corolla. Anthers free, bursting longitudinally ; pollen yellow, consisting of smooth ellipsoid longitudinally dehiscent grains. Stigmata two,

... forms of no specific value, just  
Auckland and Campbell Islands and in  
America. *G. quadrifolia* has with us pr  
unnoticed ; its extreme smallness and its  
some species of *Lobelia* tending to its eludi  
probability it will yet be discovered in th  
in New England as a companion of *Pol  
australe*, *Lysimachia Japonica*, and some  
the cooler regions of Australia and of South

The specimens sent by Mr. Baeuerlen  
thus resemble much the *G. squarrosa* ; inde  
near the Linnean *G. aquatica*.

Incidentally may be here offered a few  
cerning Australian gentianeous plants. *Se*  
at the entrance of the Barwon (J. Bracebri  
Wimmera (D. Sullivan) ; near Lake Bonr  
*S. ovata* extends to the Upper Brisbane ]  
*Erythraea australis* is on the coast-meadow  
rarely reduced to a one-flowered state, son  
1½ inches in height. *Canscora diffusa* grows  
River (W. Armit), and near Trinity Bay (V  
affinity of *Limnanthemum*, particularly in it  
*Velleya*, has already been pointed out in  
Pharmac. Soc. of Vict., 1858. n 145

## JACKSONIA CLARKII, n. sp.

Almost glabrous; branchlets rather slender, conspicuously angular; flowers comparatively large; stalklets about half as long as the calyces; bracteoles near the middle of the stalklets; flower-buds almost blunt, minutely pointed; calyces divided to near the base, about as long as the corolla, the segments glabrous, except at the margin, soon deciduous; petals of nearly equal length; anthers ovate-roundish; style setaceous, glabrous, deciduous; fruit on a rather long stipes, lanceolar-elliptical, almost silky.

On the Upper Hastings River (Dr. Herm. Beckler); on the Upper Delegate River (Mr. A. Clarke).

Nearest allied to this plant is the *Jacksonia scoparia*, which however is always more or less silky, has much smaller flowers upwards acutely attenuated while in bud, the bracteoles nearer to the calyx, the latter never glabrous, but long or even permanently persistent, the anthers narrower, the style at least partially silky and not deciduous, and the fruit smaller.

*J. scoparia* is now also known from the Nepean River (Dr. Cox), Trial Bay (Bêche), Shoalhaven River (Weir).

*J. thesioides* has more recently been gathered on the Boyne River (A. Wentw. Watson), at Glenroy (Stafford), Goode Island (Powell), Cleveland Bay (H. Gulliver).

*J. nematoclada* occurs between the Murchison River and Shark's Bay (F. v. M.).

*J. odontoclada* grows also near the Lynd River (E. Palmer).

*J. Sternbergiana* attains on the Greenough and Irwin River, a height of 40 feet. Pastoral animals browse on the branchlets; wood of disagreeable odour. This species extends southward fully to the Serpentine River, northward to Port Gregory (F. v. M.).

*J. densiflora* was found by the writer also near the Serpentine River, where the calyces attain a length of  $\frac{3}{4}$  inch; the Hon. John Forrest collected it at Mount Samson.



another congener, discovered some years but left undescribed till now.

JACKSONIA FORRESTII,

Grey-silky ; branchlets thin, angular, scattered along the upper part of the stalklets ; calyx persistent, deeply divided style long-persistent, silky in its lower sessile within the calyx, oblique ovate-conspicuously pointed, hardly longer than the seeded.

In the vicinity of the Humbert River (A

This new tropical species differs from *J.* much shorter than the calyx, in persistence in much smaller fruits not stipitate ; from . in silky vestiture, in more angular and not in not deciduous calyces, in somewhat longer fruit ; from *J. thesioides* in dense and slender branchlets, in more deeply divided tube, and probably also in the color of the species being as yet unknown ; from *J.* neither glabrous nor streaked nor viscid bracts, in smaller and silky calyces with elongated style, and smaller bracteoles

*Hedraianthera porphyropetala* (F. v. M.)

*Atriplex conduplicata* (F. v. M.)

*Kochia lobostoma* (F. v. M.)

*K. spongiocarpa* (F. v. M.)

*Aizoon zygophylloides* (F. v. M.)

*Pultenaea mucronata* (F. v. M.)

*Templetonia aculeata* (Bentham)

*Neptunia monosperma* (F. v. M.)

*Acacia coriacea* (De Candolle)

*Acacia Murrayana* (F. v. M.)

*Agonis Scortechiniana* (F. v. M.)

*Eucalyptus Baileyana* (F. v. M.)

*Hydrocotyle Javanica* (Thunberg)

*Viscum angulatum* (Heyne)

*Grevillea Victoriae* (F. v. M.)

*Hakea Macraena* (F. v. M.)

*Passiflora brachystephanea* (F. v. M.)

*Nertera reptans* (F. v. M.)

*Ethulia conyzoides* (Linné filius)

*Calotis anthemoides* (F. v. M.)

*Helipterum laeve* (Bentham)

*Ceratogyne obionoides* (Turczaninow)

*Spartothamnus puberulus* (F. v. M.)

*Najas major* (Allioni)

A few others have recently been described in the Proceedings of the Linnean Society of New South Wales.

... exhibited a number  
(*Physa gibbosa*, Gld.) abundant just  
with city water on the roof of the

Mr. Haviland exhibited a sample  
completely destroyed by the micro-fungus

Mr. Ogilby shewed a specimen of  
presented to the Australian Museum  
and one of *Macquaria Australasica*  
Dr. Ramsay and himself.

Mr. Maiden exhibited specimens of  
varieties of indigenous plants of  
contained in Vol. I. of the 'Australia

The following note was read on behalf  
Bowling. "In Nicholson's 'Manual  
that trilobites of the genus *Acidaspis*  
the facial suture continuous. Some  
the Bowling series do not conform to  
have the eyes distinctly faceted and  
discontinuous. In each of the cases in  
these organs are circular and highly c

Mr. Macleay exhibited specimens  
*Gunth.*, and *Hoplocephalus collaris*, M  
also specimens of the same snakes  
great dissimilarity of colouring.

Dr. Katz exhibited virulent preparations of the *Bacillus* of typhoid fever, obtained at Little Bay Hospital a short time ago. The exhibits consisted of pure cultures of this bacillus on and in nutrient gelatine, on nutrient agar-agar, and on potatoes. Occasion was also taken to demonstrate the process of cultivating in gelatine-test-tubes after Esmarch of Berlin. He showed also a drop-culture of this micro-organism in nutrient meat-broth under a high power of the microscope, where the active spontaneous movements of the bacillus could well be seen. In connection with the above subject Dr. Katz read the following note :—

“The microbe which you have before you in different preparations is that which must be considered as the cause of typhoid fever, as it is constantly present in this disease, and never found in others. According to quite recent investigations made with regard to the transmissibility of the bacillus of typhoid fever to animals—mice, rabbits, guinea-pigs, and dogs—there can be no doubt that this micro-organism is able to make these animals sick, and to kill them under certain circumstances. This holds equally true with experiments carried out with cultivations in which the bacilli are killed by heat, but their poisonous products preserved. Taking everything into consideration, one must believe, with Fraenkel and Simmonds, that somehow or other the microbe in question does cause pathogenic effects of some kind in the above-named animals, but is not infectious to them. Moreover, no animals, not even those which are always about man, are hitherto found to be liable to typhoid fever or to such-like diseases. With relation to the biology of the bacillus a good deal of work still remains to be done ; and, a radical cure for the disease, or a possible protective inoculation being of course still a desideratum, special attention should be paid to the more practical part of the life-history of this fungus, I mean especially to its behaviour in the dejections from typhoid-fever patients. These products naturally furnish, indirectly or directly, sooner or later, the principal sources of infection, and it is for this reason that the endeavours of experimenters should also be directed to this point.”

No. 1 (1887). *De la part du Con*

"Abhandlungen aus dem Gel  
herausgegeben vom Naturwissenschl  
IX. Band, Hefts 1 and 2. *From t*

"Comptes Rendus des Séances  
Paris." Tome CIV., Nos. 5-9 (188  
Premier Semestre (1886). Tome C

"Abstract of Proceedings of the  
(19th April, 1887). *From the Soci*

"Journal of the New York Micro  
Nos. 9 and 9a (Supplemental Numbr  
*Society.*

"Bulletin of the Museum of Com  
College." Vol. XIII., No. 2 (Dec. :

"Feuille des Jeunes Naturalistes  
*the Editor.*

"The Victorian Naturalist." W.

**"Report of the Committee of Management of the Technological, Industrial, and Sanitary Museum of New South Wales for 1886."**  
*From the Curator.*

**"The Annals and Magazine of Natural History."** 2nd Series, Vol. IX., No. 52 (April, 1852), Vols. XI.-XX.; 3rd Series, Vols. I.-VIII, Vol. IX. (Nos. 49-53), Vol. X. (Nos. 55, 56, 58, 60); **"Rhopalocera Africae Australia. A Catalogue of South African Butterflies."** By Roland Trimen. (Two Parts); **Twelve Pamphlets on Ornithology.** By E. L. Layard, C.M.G., &c.; **"Beitrag zur Naturgeschichte Bartgeiers der Centralalpenkette."** Von Dr. A. Girtanner. *From the Hon. E. L. Layard, C.M.G., F.Z.S.*

**"Société Géologique de Belgique.—Procès-verbal de L'Assemblée Générale du 21 Novembre 1886."** *From the Society.*

**"Journal of the College of Science, Imperial University, Japan."** Vol. I., Part 2 (1887). *From the Director.*

**"Transactions and Proceedings and Report of the Royal Society of South Australia."** Vol. IX. *From the Society.*

**"Plants Reputed Poisonous and Injurious to Stock."** By F. M. Bailey, F.L.S., and P. R. Gordon. *From the Chief Inspector of Stock, Queensland.*

**"Transactions and Proceedings of the Royal Society of Victoria."** Vol. XXIII. *From the Society.*

**"List of Members of the Geological Society of Australasia, &c."**  
*From the Society.*

**"The Australasian Journal of Pharmacy."** Vol. II., No. 17 (May, 1887). *From the Editor.*

"Revue Coloniale Internationale." Tome IV., No. 4 (April, 1887). *From L'Association Coloniale Nèerlandaise à Amsterdam,*

"Abstract of Proceedings of the Royal Society of Tasmania." (10th May, 1887). *From the Society.*

PAPERS READ.

BACTERIOLOGICAL OBSERVATIONS MADE AT THE  
LITTLE BAY COAST HOSPITAL.

BY DR. OSCAR KATZ.

It was not alone on account of my desire to obtain pure-cultures of the bacillus of typhoid fever (*Bacillus typhi abdominalis*, Eberth-Gaffky), with the view of having them for some intended experiments on this micro-organism (1), but also for the sake of putting forward, by means of the demonstration of its constant occurrence in typhoid fever, fresh proofs of the etiological meaning of this microbe in a country where such experiments have not yet been made known, that I applied to Dr. H. N. MacLaurin, Medical Adviser to the New South Wales Government, to permit me to make a short stay in the Coast Hospital at Little Bay, a place admirably fitted for carrying out investigations of that kind. I gladly avail myself of this opportunity of tendering Dr. MacLaurin

---

(1) Among a number of cultures of bacteria in agar-agar which Professor Flügge had been kind enough to send to me at the end of last year, there was also the typhoid-bacillus. But unfortunately in this culture on its arrival life was extinct. In the test-tube it had only little expanded; that it was no more alive may be accounted for by the fact that the tube, together with others, had been sent away (via Bremen) immediately after their having been supplied with culture-material, at a time (end of November), when a formation of spores could not be expected. The bacilli very likely died from want of air, which had no access to the interior of the glass-tubes these having been provided with tightly fitting india-rubber-caps.



...cultivate the typhoid  
main, to organs of persons who die  
dejections from typhoid fever patients

It is well to say in advance that in the  
the micro-parasite in question, I made  
process, and Esmarch's method of cultivation  
the former nothing more requires to be  
which I took occasion to demonstrate  
Society, April, 1887, a detailed description  
Zeitschrift für Hygiene, Band I., Heft  
301; an abstract in Flügge's Microbiology  
p. 656. This method was given the preference  
the working after the same is connected  
time, does not require much apparatus  
yields quite good results. According to  
satisfactory cultivations after this procedure  
following manner. The test-tubes containing  
gelatine (or agar-agar), which in  
tubes should not be more than about 6 or  
8 p.c. gelatine—are first supplied at the top  
with tightly fitting caps of indiarubber  
laid on a level surface are also nearly level

layer of quite transparent solidified gelatine (or agar-agar). For stick-cultures I used a 6 p.c. nutrient gelatine; for streak-cultures (on an inclined surface) the same, and occasionally a 1 p.c. nutrient agar-agar.

Now it need scarcely be mentioned that, from the mere behaviour of pure cultures in stick and in streak of the typhoid-bacillus, from the appearance of its colonies in diverse nutritive substances either on macroscopical observation or on being viewed with low-magnifying powers, and then from the image of the individual bacilli out of such cultures or out of organs under high powers of the microscope, an exact inference as to their undoubtedly belonging to the *Bacillus typhi abdominalis* cannot be drawn. With regard to the last-named point I can confirm the statements of others, namely, that the dimensions of the rods are not constant, and that these variations depend in the main on the kind of the nourishing material, out of which cultures of the microbe are microscopically examined.

Even the staining reaction of the typhoid-bacilli which become discoloured after the method of Gram (see Flügge, *Microorganismen*, p. 643, or any book dealing with the methods of investigation in Bacteriology) cannot be any more maintained as being diagnostic of these schizomycetes, as a bacillus isolated by Escherich from the faeces of young children, and called by him *Bacterium coli commune* (Flügge, *Microorganismen*, p. 269) exhibits the same peculiarity if treated after Gram's method. The only decisive means, so far as known, enabling us to distinguish typhoid-bacilli from all other bacteria, is rather their characteristic growth on slices of boiled potatoes; in the repeatedly named work of Flügge full particulars may be had. By subsequent study of the bacilli, however, it has been noticed by several investigators that these do not always grow on the potato-surface in the shape of a coherent, resisting membrane which was considered as typical by Gaffky, the first who worked with pure cultures of the bacilli, but that now and then they also

... of treatment in the Ho  
typhoid fever was here for the last  
small, although the number of cases  
For this reason I was only able  
corpses. The patients had died du  
plaint; the bacteriological examination  
liver, mesenteric glands—always to  
fresh. The search for typhoid bacteria  
each of the three cases, in so far as  
than is commonly the case, (1) in culture  
or vegetations of a micro-organism  
by the potato-culture to be the *Bacillus*  
Gaffky). In two of the three cases  
micro-organism found; in the third  
of the liver was possible, in addition  
the typhoid-organism a few sulphur  
developed. Whether these were at  
contamination (the whole manipulation  
or not, I was unable to trace; in fact  
importance.

I should have been glad to have  
examining more than these three  
not the

the Germans), and provided the patients had succumbed before the ulcerations of the small intestine had completely disappeared, or before any such ulcerations were at all met with. The latter phenomenon, I am told, is often observed in severe epidemics, when the sick are carried off very rapidly. In a publication of recent date on this subject, Fraenkel and Simmonds say (*Zeitschr. f. Hygiene*, Bd. II., Heft 1, 1887, p. 138) that they have now come to look upon the results of the bacteriological examination of the abdominal viscera (spleen) as conclusive in all cases where the macroscopical features of the abdominal organs are insufficient to secure the anatomical diagnosis. They furnish a characteristic instance where the clinical observation admitted of a diagnosis other than typhoid, and also the result of the *post mortem* was in no way decisive until the disclosure of typhoid-bacilli put an end to every doubt. They give also as instance a striking illustration of a case which clinically looked very much like typhoid, and for which the *post mortem* failed to allow an undoubted answer as to its nature, till consequent upon the absence of colonies of typhoid-bacilli in gelatine-plates sown with spleen-pulp, this answer could be given in a negative sense.

I now wish to say some words about the results of experiments made on dejecta from typhoid-patients with the view of finding, and isolating the typhoid-bacilli. I have carried out a good number of such experiments; the evacuations coming from patients in different stages of the disease were examined quite fresh. Everybody who has made similar examinations knows that the diseased intestines contain enormous masses of bacteria, both in quantity and quality, and that for this reason only minute parts of the raw-material should be started from. I generally mixed a medium-sized platinum-loop full of the dejection with about 10 ccm. of a .6 p.c. sterilised salt solution in a test-tube, thence preparing two attenuations in nutritive gelatine by taking about three platinum-loops each time. The contents of the second gelatine-tube afterwards proved to be mostly fit for examination.

beginning of the fever are not always q  
after what Dr. Peirce was good enough  
the cases under treatment, which f  
might have had to do with typhoid  
in the above Hospital a *post mortem*.  
Young on a man who had been sent to  
from pneumonia, presumably second  
ileum, however, failed to show any tr  
existed alterations of a typhoid charac  
agar sown with pulp of spleen grew  
micrococci which were not further exam

As already indicated in several cu  
the disease was in middle stages, c  
considerable numbers were found whi  
the bacillus of typhoid fever. I may a  
above, from entering into a detailed des  
exhibited by the bacilli under cultivation  
media, etc.; those who are more es  
matter will find every information in J  
Leipzig, 1886. What is besides ne  
variations in their mode of growth on  
dealt with above (pp. 205-207).

Time did not permit

perhaps the commonest of all were colonies of bacilli which bore a certain resemblance to those of the typhoid-bacilli, and which are probably the same as *Bacillus Neapolitanus* (Emmerich) (1). The potato-culture each time revealed their non-identity with the *Bacillus typhi abdominalis*.

As a matter of curiosity rather than interest I may mention that I once found, on a plate of gelatine, a non-liquefying colony of slender bacilli which grew in the shape of a beautiful, greyish network of delicate, much elongated ramifications; such colonies bear a strong resemblance to those of *Micrococcus viticulosus* (Flügge-Microorganismen 1886, p. 178); the mode of growth on an inclined surface of nutrient gelatine is also similar.

There was no opportunity for me to extend the search for typhoid-bacilli to blood from typhoid-patients. During my stay at the Hospital no well-marked cases of roseola-formation having occurred, I preferred to leave this kind of examination in suspenso. However, I tried some blood from a roseola-like spot with one patient, but without success.

My wish to obtain some exact data as to the disinfecting and destroying powers of the commonly used disinfectants for typhoid dejections—carbolic acid, carbolised chalk, sulphate of iron, and some others; and further to ascertain how the typhoid germs in such dejections are acted upon by pure lime and slaked lime, the efficiency of which substances on cultures of cholera-spirilla and typhoid-bacilli has lately been experimentally proved by Liborius (Zeitschrift f. Hygiene, Bd. II., Heft 1, 1887, pp. 15-51), has equally to be put off to some later date.

---

(1) Flügge, l.c., p. 270-272. It is much to be regretted that a pure-culture of this bacillus sent to me by Professor Flügge, with other cultures, did not survive the voyage. It is to this microbe that Emmerich attributes or attributed the cause of Asiatic-cholera. According to other observers, however, this microbe is a common appearance in the contents of the intestines of man and animals.

single or aggregated  
were abundant. I hope to be able b  
to the knowledge of the biology of t

# THE INSECTS OF THE CAIRNS DISTRICT, NORTHERN QUEENSLAND.

BY WILLIAM MACLEAY, F.L.S., &c.

In the following pages I give descriptions of some of the novelties contained in a collection which I recently received from Cairns and its neighbourhood. The collection was made during last year by Mr. W. W. Froggatt, the Naturalist of the New Guinea Expedition of the previous year; and it contains a large number of species of all Orders of Insects hitherto unnoticed and unnamed. It is my intention to name and describe from time to time such of these novelties as I can find time to work up, and in doing so I shall take the groups and families in the order I find most convenient. On the present occasion I confine myself to some of the *Geodephaga*, *Lamellicornes*, and *Malacodermes*.

All the species named are from the Cairns district, and the special localities assigned to some of the insects, such as Barron River, Mossman River, Mulgrave River, and Russell River, are all more or less in the vicinity of Cairns.

## GEODEPHAGA.

### CICINDELIDÆ.

#### 1. CICINDELA FROGGATTI.

Of an opaque bronzy hue, with golden green reflections. Head densely acuducted. Eyes prominent and distant. Antennæ with the first four joints golden-green, the remainder dull; the labrum of a pale yellow colour, rounded in front, with about 10 setigerous punctures; the tips of the mandibles and terminal joints of the palpi green. The thorax is scarcely longer than wide, minutely and densely granulose-punctate, with two deep transverse depressions, one near the apex, the other near the base. The elytra are



and a spot of the same colour about  
in the middle of an obscure blackish  
of my specimens there is above this  
golden one.

Length, 3 lines.

*Hab.*—Mossman River.

## 2. DYSTIPSIDERA F

Black, with coppery or brassy reflex  
versely acuducted behind and in front,  
eyes, a transverse semilunar depression  
joint of the antennæ, a spot below the in  
outer side of the base of the mandibles,  
and the palpi with the exception of  
Thorax about as wide as long, very de  
near the apex, less deeply so near the  
very transverse, and rounded on the side  
striolate. Elytra broader than the thor  
the length, punctate and transversely s  
the base, a median somewhat wavy fascia  
and the apex, yellow; the suture termi  
The legs, with the exception of a portion  
thighs, yellow or reddish yellow.

Length, 8 lines.

*Hab.*—Cairns

## 3. DISTYPSIDERA PASCOEI.

Cyaneous-black, the head and thorax a little coppery. Head as in the last-described species, but rather more hollowed between the eyes, without the yellow spot below the insertion of the antennæ, the striolation generally finer, and the outer side of the mandibles white nearly to the tip. The thorax is shaped like that of *D. flavipes*, but much more smoothly sculptured. The elytra are transversely rugose and thinly punctured. A round spot on the base near the suture, larger humeral spots with a lunulate extension towards the middle of the disk, and two spots about one third from the apex, narrowly joined together, one touching the lateral margin, the other not reaching the suture yellow. The apex of the suture is slightly pointed. The thighs are reddish yellow with a brownish tint on the outside and towards the apex, the tibiæ and tarsi are all somewhat brownish.

Length,  $7\frac{1}{2}$  lines.

*Hab.*—Cairns.

This species seems to resemble Mr. Pascoe's species, *D. Grutii*, from Lizard Island, but Mr. Pascoe's description differs in some respects so much from the present insect, that they cannot possibly be the same. I have named it after that distinguished Entomologist.

## 4. DISTYPSIDERA PARVA.

Brassy-green on the head and thorax, darker and bluish on the elytra, and cyaneous beneath with yellow legs. The head is large, finely acuducted, and less depressed between the eyes than in the other species; the eyes are very large and prominent; the labrum is strongly toothed and white except an unusually narrow stripe on each side; the palpi are entirely whitish-yellow. The thorax is much narrower than the head, longer than broad, and transversely divided as in the other species, but the central section less rounded and nearly parallel-sided. Elytra broader than the thorax and twice the length, transversely rugose and rather densely punctate, rounded at the apex and slightly broader than at the shoulders, the basal third of a dull reddish-yellow, and about the

Entomologie," descriptions of two species from Cape York. Those I have not, though not probably, be identical with but that cannot be determined with certainty and they are inaccessible to Australian readers. Published his descriptions of Australian Scientific Societies' Journals of St. Petersburg done by his countrymen Baron de Chaudoir would have been no difficulty in getting his chosen as his vehicle of publicity. An unprocurable book, he must not feel altogether ignored by Australian Entomologists.

## CARABIDÆ

### 5. *HELLUOSOMA VIRIDIPES*

Piceous-black, nitid, elytra metallic-green, hairy. Head thinly punctate, the clypeus hairy. Thorax rather broader than the head, coarsely punctate, deeply impressed near base truncate. Elytra broader than the thorax, the length, punctate striate, the interstices rather rugosely but not densely punctate. Upper surface of the insect clothed with

Length 0.25"

6. *HELLUOSOMA LATIPENNE*.

Entirely piceous-black, with a thin whitish pubescence. Head thinly punctate and largely smooth in front. Thorax cordiform, roughly punctate, an oval longitudinal space on the median line bounded on each side by an irregular elevation. Elytra broader than the thorax, three times the length and paralld-sided, densely punctate and deeply striate, the interstices much more convex than in *H. aterrimum*, MacL., the species it most nearly approaches.

Length, 9 lines.

*Hab.*—Cairns.

7. *GIGADEMA ATRUM*.

Black, nitid, elytra somewhat opaque. Head smooth, without punctures, deeply impressed on each side, terminal joint of palpi triangular, the labial almost securiform. Thorax cordiform, deeply marked on the median line, finely acuducted transversely. Elytra broad, long and flat, striated, the interstices broad and little convex, without distinct puncturation, but two rows of extremely minute punctures each bearing a very short decumbent seta or setiform scale, may be traced on each interstice; the elytra are scarcely truncate behind.

Length, 12 lines.

*Hab.*—Russell River, Cairns District.

This insect departs considerably from the typical species of the genus. The absence of puncturation, and the triangular palpi constitute its chief peculiarities.

8. *DEMETRIAS RUFESCENS*.

Entirely piceous-red or yellow, excepting the elytra which are piceous-brown, and very nitid on both surfaces. Head longer than broad, narrowed a little behind, an irregular longitudinal impression on each side between the eyes, with a small impression in the middle, both palpi pointed but not acutely. Thorax rather

by minutely punctate, the inter  
without punctures, but with a punc  
towards the apex, which last is  
emarginate on each side.

Length, 3 lines.

*Hab.*—Cairns.

This insect is undoubtedly a *Demetri*  
in Australia, if we except Chaudoin  
which I am inclined to believe sho  
*Xanthophoea*.

#### 9. COLPODES MUCH

Flat, elongate-ovate, bluish-black, ve  
brilliant bluish-purple. Head longer  
behind the eyes than in front. Eye  
longitudinal impresssion on each side  
antennæ hairy from the middle of  
broader than the length, the apex a lit  
angles rounded; the sides rounded,  
broadly and flatly margined, the base to  
apex, and the posterior angles acute ar  
are wide and flat, with about 8 very fir  
the interstices quite flat and small.

## 10. SCOPODES FASCIOLATUS.

Coppery-bronze, with a more or less metallic lustre over the whole upper surface; legs and palpi yellow. Head irregularly foveated in front. Thorax as wide as the head with the eyes, much wider than long, a little narrowed at the posterior angles, truncate in front and lobed behind, a little angular on the sides behind the anterior angles the angle marked by a setigerous puncture, and a fovea on the disk on each side of the median line. Elytra broad and flat, striate, with the interstices convex, and a few small foveæ on them; a broad yellow lozenge-shaped fascia behind the middle, joining or nearly joining a larger one on the basal portion, occupy nearly the whole of the elytra.

Length,  $1\frac{1}{2}$  lines.

*Hab.*—Cairns.

## 11. HOMALOSOMA OPACIPENNE.

Elongate, narrow, black, very opaque. Head smooth and nitid; a deep short impression on each side between and a little in front of the eyes, and a smaller and lighter impression on each side of the clypeus. Antennæ and palpi piceous. Thorax rather longer than wide, the sides with a broad and thick reflected margin; anterior angles rounded and produced, sides rounded and narrowed at the base, which is very slightly rounded; the posterior angles not acute but nearly rectangular. Elytra narrower than the thorax, slightly widening from the shoulders to behind the middle, and conjointly rounded at the apex, each elytron having besides a sutural costa three sharp ridges with wide flat interstices and a double row of punctures on each; the first and third of these forming a junction near the apex, the second a little abbreviated, a very broad double groove occupies the lateral margins; the base of the second costa forms an obtuse reflected tubercle at the humeral angle. Under surface nitid, black; palpi, antennæ and tarsi piceous.

Length, 10 lines.

*Hab.*—Mulgrave River.

the base, moderately margined, with the apex and base, a well-marked me depression near each posterior an widest in the middle, the humera broader than the thorax, with seve each elytron, the interstices costate ridges almost sharp. The legs, ant black.

Length, 12 lines.

*Hab.*—Mossman River.

These are not by any means all the the Cairns collection, but the others I am unwilling to add to the already over group, until some more explicit and in vision is devised for them.

## LAMELLICORID

### Family COPRID

#### 13. CEPHALODESMIUS

Shortly ovate, longer than broad, sub-opaque. Head broad, hemispherical, puncture furnished with a minute circular large. with the mouth.

rounded and flattened, the sides nearly straight, the base slightly rounded, a conspicuous puncture about the middle of the sides, and finely punctured all over, the punctures with minute scales as on the head. Elytra as broad as the thorax and broader than long, with about seven extremely fine striæ on each, the interstices broad, perfectly flat, and irregularly marked with rows of extremely minute punctures, from which spring short decumbent setigerous scales.

Length, 3 lines.

*Hab.*—Mossman River.

#### 14. MERODONTUS SQUALIDUS.

Of a dirty black or grey appearance all over, longer than broad. Head transverse, two minute tubercles between the eyes, the clypeus very slightly emarginate with three very minute teeth on each side. Thorax a little broader than long, much elevated in front by two ridges rising perpendicularly from the middle of the apex, on each side are two abbreviated ridges, and on the posterior part of the thorax six similar ones: the anterior angles are much enlarged and flattened. The elytra are flat, longer than broad, and about the width of the thorax, the apex at the suture terminates in a square prolongation of each elytron, while the posterior angles are roundly prolonged in a similar degree, leaving four deep narrow emarginations along the apical margin, the lateral edge presents a somewhat scalloped appearance, the disk is furnished with four rows of small velvety-looking tubercles on each, most numerous on the sutural rows, and least so on the lateral row, those on the other two rows are generally larger than the others. The spur on the under side of the posterior thigh is in this species in the middle, and the hind tibiæ are less curved than in *M. calcaratus*.

Length, 3 lines.

*Hab.*—Cairns.

#### 15. TEMNOLECTRON POLITULUM.

Broadly ovate, convex, black, very nitid. Head smooth, semi-circular in front with a narrow reflexed margin, two very minute teeth in the middle of the apex, and a small sharp notch on each



1  
iens. The pygidium is exposed and legs are piceous and rather strong, curved, the anterior are serrated above. In specimens the elytra are piceous.

Length,  $2\frac{1}{4}$  lines.

*Hab.*—Cairns.

#### 16. EPILISSUS GL

Ovate, convex, black, nitid, the humeri black. Head smooth, very minutely punctate, in front, with a small emargination and a tooth on each side of it. Thorax transverse, rounded behind and on the sides, and with a short impression near the middle of each side. Elytra the thorax and widest in the middle, longer than wide, and very finely and faintly punctate.

Length,  $1\frac{1}{2}$  lines.

*Hab.*—Cairns.

#### 17. ONTHOPHAGUS FR

Black, very nitid, the head and thorax black. Head finely punctate, clypeus larger than the head, of triangular form, the sides rounded, the back of the head produced to the apex of which rise two longish hairs.

rather shorter than the thorax and flattish on the back, with 7 or 8 rows of distinct but rather small punctures on each elytron, the punctures on the 6th row the largest. The pygidium and under surface cinereo-villose. Legs clothed with reddish hair.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Cairns.

This species most resembles *O. furcaticeps*, Masters.

#### 18. ONTHOPHAGUS WALTERI.

Black, nitid, the head and thorax coppery-green. Head densely punctate at the ocular angles and on the clypeus, in the male a little triangular in front, and with a rather acute tubercle on each side of the forehead near the eye, in the female a strong transverse ridge immediately above the eyes. The thorax is very large, convex, rounded on the sides and transverse, and very minutely punctured in the male; the apex is slightly retuse, and above it are two strong obtuse tubercles with a rather deep emargination between; in the female there is less retuseness and no tubercles; the median line is visible in both sexes. The elytra are not so broad as the thorax and slightly shorter, and are each marked with 9 punctured striæ, with the interstices slightly convex. Pygidium coarsely punctate, under surface thinly cinereo-villose.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Cairns.

#### 19. ONTHOPHAGUS PARALLELICORNIS.

Black, subnitid. Head finely punctate in front, smooth behind, extending into a square lamina truncate in the middle, with two upright parallel horns, one at each angle; the clypeus is large, roughly punctate, and roundly pointed, and reflexed. Thorax transverse, smooth, nitid, finely punctate, without excavation or tubercle in front, the anterior angles advanced and acute, the sides much bulged out, with a fovea in the middle, the base largely rounded. Elytra scarcely so long and not so broad as the thorax,

*Onthophagus*, very nitid, the head and  
finely and rugosely punctate, in fr  
suture raised, and a transverse ridge  
middle and triangularly raised and  
of the head. Thorax smooth, in  
tubercle, emarginate in the middle  
the sides jutting out into two strong  
striated behind, with a deeply  
The elytra quite smooth with fine  
other respects resembling the prev  
pygidium and under surface rather

I have numerous specimens res  
pects, though very different in  
In the absence of proof I cannot  
this species, and it would be still w  
them as distinct.

Von Harold who has devoted  
*Onthophagus*, has I regret to say  
work he has done, by his frequent  
his unmatched females.

Length, 4 lines.

*Hab.*—Cairns.

## 21. ONTHOPHAGUS

BY WILLIAM MACLEAY, F.L.S., &C.

angles advanced and rather acute, the sides not much bulged out, the base and posterior angles rounded, and the whole surface finely and rather thinly punctate. Elytra about as wide as the thorax but rather shorter, striated, the striæ very fine and minutely punctate, the interstices opaque, flat, and very indistinctly punctate except near the sides, the humeral angles and the apical callus indistinctly rufopiceous. Pygidium coarsely and thinly punctate. Under surface very sparingly villose.

Length,  $2\frac{1}{2}$  lines.

*Hab.*—Cairns.

Family MELOLONTHIDÆ.

22. PHYLLOTOCUS VITTATUS.

Of rather elongate form, subdepressed, black, opaque. Head coarsely and thinly punctate, the clypeus narrowed and recurved in front. Thorax nearly square, subsericeous, thinly and coarsely punctate, the anterior angles acute and prominent; the sides almost angled before the middle, then running in a straight line to the base, which is almost truncate. The elytra are little broader than the thorax, and about twice the length, strongly punctate-striate; the interstices convex and smooth, the alternate ones a little larger; a ferruginous vitta occupies the disk of each elytron, broad at the base and narrowing towards the apex which it does not quite reach. The legs and antennæ are yellow, the hind tibiæ black. Long thinly placed hairs extend along the lateral margins of the whole upper surface, the under surface is thinly clothed with the same.

Length, 2 lines.

*Hab.*—Mossman River, Cairns.

The two following species are to all appearance of the genus *Scitala*, but cannot be placed in that genus on account of the very different antennæ. *Scitala* is described as having 8-jointed antennæ, the first joint long and much and suddenly swollen at the apex; the 2nd rather thick and turbinate; the 3rd somewhat long; the 4th variable, sometimes as long as the 3rd; the 5th

### 23. PLATYDESMUS

Oblong oval, black, sub-opaque and roughly punctate, the clypeus in front rounded and narrowly rufous, the club of the latter as long as the body and slightly sinuate. Thorax truncate, punctate, the anterior angles acute, the base wider than the apex and of rounded triangular form, and dusky, wider than the thorax, and more rounded and amplified on the sides, deeply striated, the striae punctate, very sparingly minutely punctate. Abdomen broad and spinose; the fore tibiae rufous and slightly cinereo-villose.

Length, 4 lines.

*Hab.*—Mossman River, Cairns.

### 24. PLATYDESMUS

A larger and more convex species. Head black, thinly punctate, the front rounded as in the last species, with the palpi and antennae rufous red, the tarsi of great length and much curved. Tarsal claws black. Abdomen in form like the last.

striae punctate and the interstices almost flat, and irregularly and faintly punctate. Legs and under surface piceous red, in every other respect like *P. sulcipennis*.

Length,  $5\frac{1}{2}$  lines.

*Hab.*—Mulgrave River, Cairns.

#### 25. LEPIDIOTA FROGGATTI.

A very large convex species, of a nitid black colour, but so densely clothed with short setiform scales as to give it an opaque dirty grey appearance. Head transverse, the eyes large and half-concealed by the thorax, clypeus very much broader than long, largely rounded at the angles and marginate and reflexed at the apex. Thorax transverse, much broader than the head, very densely scaled, emarginate on the anterior border which is ciliated with long hairs, a little rounded on the sides which are slightly crenulate, and bisinuate at the base which is broader than the apex. Scutellum transverse, rounded behind. Elytra as broad as the thorax at the base and gradually becoming wider towards the apex, where they are jointly a little emarginate, three times the length of the thorax, and rugosely punctate, with four rather smooth raised lines on each elytron, the two nearest the suture joining and forming a callus near the apex. The pygidium is rugosely punctate and moderately scaly. The sterna are clothed with cinereous hair, the abdominal segments with short setiform scales. The legs are strong, very coarsely and rugosely punctate, and armed with strong setae, the anterior tibiae are strongly tridentate, the claws of all the tarsi are armed on the middle of the under surface with an acute strong curved tooth.

Length, 17 lines.

*Hab.*—Barron River.

#### Family RUTELIDÆ.

#### 26. POPILIA FLAVOMACULATA.

Ovate, moderately convex, brassy green on head and thorax, reddish-brown and very nitid on the elytra and legs. Head finely punctate and clothed with a short yellowish decumbent pubescence,

front and more rugosely puncta  
*M. elongatus*, and the central areole  
blackish. The elytra are five times  
quadricostate, the intermediate sma.  
than in the last species, the inter  
Length, 8 lines.

*Hab.*—Cairns.

### 31. METRIORHYNCHUS

Black, thorax and elytra red, the l.  
black. Rostrum elongate, reddish on  
of equal thickness throughout, and the  
Antennæ compressed, each joint acu  
apex; the third joint longest, the re  
long as wide, the 7 areolets deeply ma  
punctate, the apex and interior angles  
widening to the base with a tooth-like  
middle, and the base bi-emarginate,  
acutely angled. Elytra elongate, c  
densely packed with two rows of tra  
tures, separated by minute ridges. '  
four to the knee joint, in the posterior  
Length,  $6\frac{1}{2}$  lines.

*Hab.*—Mossman River

antennæ serrate, but the joints longer than broad, the third largest; the basal joints have a reddish-brown tint, caused by a very short sericeous pubescence. The thorax has a broad recurved lamellate lateral margin; the anterior angles are acute and prominent, the apex emarginate on each side and roundly lobed in the middle, from the acute anterior angles the foliated sides extend outwards and upwards to an angle behind the middle, whence they run straight to the posterior angles, which are scarcely acute. The base is biemarginate as usual, the disk is black from the base to the central anterior areolets; the 7 areolets are less deeply and more rugosely marked than in the last described species. The description of the elytra is the same.

Length,  $5\frac{1}{2}$  lines.

*Hab.*—Mossman River.

### 33. METRIORHYNCHUS HIRTIPES.

This species differs very much from all the species of *Metriorhynchus* I have seen. Black, excepting the elytra and the foliated lateral margins of the thorax, which are red. Rostrum long, nearly cylindrical, maxillary palpi swollen at the apex. Antennæ long, the 3rd joint much longer than the 4th; from the 4th to the 10th the inner apical angles are much produced. Thorax widely foliated on the sides and in form an exaggerated resemblance to *M. foliatus*, but with the apex of the anterior angles rounded; the anterior central areolets are rather confounded with the discal one, which is large and deep. The scutellum is black. The elytra are long and taper towards the apex; the sculpturation like that of the other species. The legs are clothed beneath with long fulvous hair. The sides of the abdominal segments are whitish.

Length, 6 lines.

*Hab.*—Mossman River.

### 34. XYLOBANUS FUMOSUS.

Entirely of a smoky brown. Antennæ broadly serrate, compressed, the third joint not longer than the fourth, the last joint the longest. Thorax a little broader than long, distinctly 7-areolate, the apex and anterior angles rounded, the sides almost



### 35. XYLOBANUS

Black, with the thorax and base yellow. Antennæ long (reaching nearly to the tip of the abdomen), the third joint not longer than the second. Thorax transverse, lightly marked, the anterior ones slightly elevated, the sides widened at the posterior angles acute, and the base narrow in the middle. Scutellum oblong, emarginate at the apex, black with the tips of the apex yellow, broad and well rounded at the apex, the middle of the apex remarkable. The legs are less flattened than the terminal segments of the abdomen.

Length, 5 lines.

*Hab.*—Russell River.

### 36. XYLOBANUS MINOR

Black, with the thorax cinnabar-red, the sides of the elytra little on the costæ of the elytra. Antennæ long, the joints wider than long, the third joint not longer than the second. Thorax transverse, distinctly 7-areolate, with a deep impression at their base, the anterior angles nearly

37. *XYLOBANUS AMPLIATUS*.

Of an opaque black, with the exception of the thorax and basal fourth of the elytra which are reddish-yellow. Antennæ long, serrate, the third joint rather longer than the fourth, the terminal joint longest and acuminate. Thorax broader than long, rounded in front, widened behind, the anterior angles obtuse, the posterior acute, 5-areolate, the discal areolat narrow and extending to the apex. Elytra of the usual quadricostate sculpture, and considerably widened towards the apex. Legs short and moderately stout, the sterna and the base of the four anterior thighs are yellow.

Length, 4 lines.

*Hab.*—Barron River.

38. *XYLOBANUS ATER*.

This species might be more properly placed in another genus. The colour is entirely opaque black. The head is small, and shows distinctly in front of the thorax, the eyes are very prominent, the antennæ are strongly serrated, the third joint scarcely longer than the fourth. The thorax is transverse, the apex almost truncate, the sides widening towards the base, the posterior angles very acute, the discal areolet raised and well marked, the other areolets indistinct, but their positions marked with depressions, and the colour is of a somewhat nitid black. The elytra are strongly quadricostate, with the transverse lines also distinct. The legs rather slight.

Length, 3 lines.

*Hab.*—Barron River.

39. *XYLOBANUS FROGGATTI*.

Black, the thorax and elytra orange-red. Antennæ serrate, the third joint equal to the fourth, all longer than broad and nearly truncate. Thorax as long as wide, the apex and base nearly truncate, the latter much wider, the posterior angles very acute, the discal areolet joined to the anterior margin by a carina, the rest of the disk uneven. Scutellum with the posterior margin truncate and thick, with a deep impression in front of it. Elytra

*Bulenides*.

40. XYLOBANUS A

Opaque black, the thorax red. A little larger than the fourth, all more broad. Thorax transverse, rounded at the anterior angles, widened at the base; the posterior angles acute, the middle of the lobe with a notch in the middle of the lobe; the rest of the surface unequal. Elytra quadricostate with two rows of punctures. Length, 4 lines.

*Hab.*—Barron River.

41. CLADOPHORUS P

Black, the thorax and basal two-thirds of the antennae serrate, in the male flabellate. Antennae longer than the fourth; all the joints except the fourth joint. Thorax broader than the length, rounded at the base, wider at the base than the apex; the elytra lanceolate extending from base to apex, the apex defined. The elytra have the usual smooth, less deep and rough character, and the interstices between the costae are more numerous. short and flat.

Length 4 lines.

than the joints themselves. Thorax slightly transverse, a little rounded in front, a little constricted in the middle, expanded into an acute angle at the posterior angles, lobed in the middle of the base, and 7-areolate on the disk, the middle one confined to the basal half, the others not very perfectly defined. The elytra are strongly quadricostate and punctured.

Length, 3 lines.

*Hab.*—Cairns.

#### 43. CLADOPHORUS MINIATUS.

Black, the thorax and elytra deep red. Antennæ strongly branched, the branches quite twice the length of the joints. Thorax transverse, rounded in front, not widened behind, biemarginate and lobed at the base, 7 areolate, the middle one lanceolate, almost reaching the anterior margin, the others rather distinctly defined. Elytra with numerous fine costæ, the alternate ones larger, the interstices closely punctured, the punctures somewhat quadrangular.

Length,  $4\frac{1}{2}$  lines.

*Hab.*—Barron River.

#### 44. TRICHALUS ANGUSTULUS.

Black, nitid, narrow, the thorax, elytra, coxæ, and base of thighs yellow. Antennæ scarcely serrate, the joints longer than wide, rostrum short. Thorax rather longer than wide, almost truncate in front, sides gradually widening to the base with acute angles, a short narrow median areolet, and a deep depression on each side of it. Elytra narrow, strongly costate, four costæ on each elytron at the base, three only on the apical three-quarters, with the interstices minutely costulate and quadrangularly punctured.

Length, 4 lines.

*Hab.*—Barron River.

#### Family TELEPHORIDÆ.

#### 45. TELEPHORUS MOSSMANI.

Head, thorax, elytra, prosternum, the basal part of each abdominal segment, the coxæ and base of thighs and the palpi

median line. Elytra about five times as long as wide, and scarcely wider than it, parallel, truncately rounded at the apex, dense silky yellow pubescence, (which is for the most part but less dense) and minutely and irregularly punctate, with a few obsolete longitudinal lines. Head slender, the eyes small and prominent. Length, 3 lines.

*Hab.*—Mossman River.

46. TELEPHORUS

Head, thorax, elytra excepting the apex reddish-yellow, the rest black. Head antennae taking their rise between the second and third, the third shorter than the fourth. The elytra margins more expanded and the angle more rounded. *Mossmanni*, and the foveae on the side line is distinctly marked. The elytra black at the apex, sculpture and clothed with dense yellow pubescence. *T. Mossmanni*, but the puncturation obsolete.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Mossman River.

47. TELEPHORUS RU

of the

mandibles are large and tipped with black. The thorax is very like that of the last species, *T. rubriceps*, but the median line is not so continuously canaliculate. The elytra are less densely pubescent, and more deeply tipped with black than in the preceding species, the minute rugose puncturation is more distinct and the whole surface more nitid.

Length, 4 lines.

*Hab.*—Mossman River.

#### 47. TELEPHORUS FROGGATTI.

Black, the thorax red, the elytra lurid brown. Antennæ inserted almost under the eyes, slightly serrate, the apex of each joint truncate, the third about equal in length to the fourth. Head nearly covered by the thorax. Thorax much broader than long, quadrangular, margined, and deeply impressed on the median line. Elytra blackish at the base and apex, with a yellowish brown tinge towards the suture and a sericeous pubescence and dense minute puncturation over the whole. The coxæ and the sides of the abdominal segments are of a yellowish colour.

Length,  $2\frac{1}{2}$  lines.

*Hab.*—Mossman River.

#### 48. SELENURUS APICALIS.

Head black, elongate, perpendicular, forming a short snout; the antennæ, inserted in front of the eyes on a yellow patch, filiform, the third joint much shorter than the fourth. Thorax testaceous yellow, rather narrower than the head with the eyes, much longer than broad, margined all round, not wider behind than in front, rounded at the angles, rounded and reflexed at the apex and base, and unevenly foveated on the disk. Scutellum with a small black depression at the apex. Elytra rather wider than the thorax at the base, and narrowing to the apex where they are nearly acute and very dehiscent, rather shorter than the wings and body, of a yellowish-brown on the basal region, and a dull black behind, with a yellow apex to each elytron; the sculpture is rough and exceedingly minute, and there is a very small longitudinal ridge

#### 49. SELENURUS

This species much resembles the .  
as follows :—The antennæ are inser  
thorax has a large square black or  
the anterior half. The elytra are  
some distance behind, the yellow  
along the suture, black for some dis  
the tip of each elytron ; the dehis  
and less acuminate than in the prec  
ringed and spotted on each side with  
slender and ringed with yellow.

Length, 4 lines.

*Hab.*—Mulgrave River.

#### 50. SELENURUS VIR

Head black, minutely striolate, a s  
insertion of the antennæ, a slight dep  
a deep corrugated impression betwe  
flatter than in the last species and not  
and uneven on the surface with a black  
disk. Elytra broader than the thor  
the apex, nearly as long as the body, c  
and very densely and minutely punc  
longitudinal lines . . .

**DESCRIPTION OF A NEW SPECIES OF *EPIMACHUS*,  
FROM THE ASTROLABE RANGE, S. E. NEW GUINEA.**

**BY DR. E. P. RAMSAY, F.R.S.E., F.G.S., &c.**

***EPIMACHUS MACLEAYANÆ*, sp. nov.**

*Adult Male*.—Total length, 3 ft. 6 in. ; tail, 2 ft. 7·3 ; wing, 7·2 ; tarsus, 2·2 ; bill from forehead, 3·2 ; from gape, 3·1 ; along the curve of the culmen from the forehead, 3·3 ; height of bill at base, 0·3 ; width at gape, 0·6 ; at nostril, 0·4 ; the longest side chest plumes, 4·7 by 2·1 in breadth at the tip ; flank plumes, 6·2 ; the long decomposed flank plumes, 8·6 inches. The head, throat, back, wings, rump, and all the upper surface velvety black, all except the neck, wings and rump, with rich metallic glossy scale-like feathers with steel-blue, green, and violet reflections ; rump and upper tail-coverts velvety black with steel-blue tips to the feathers, two centre tail feathers, long, narrow (3·5 in width), black, with blue and purple reflections, the others black without any sheen or gloss. The chest, breast, and all the under surface olive-brown, with rosy mauve reflections, plumes on side of the chest, broadly margined with steel-blue green and violet reflections, in shape somewhat triangular, being greatly expanded at the tips, the lower side-plumes shorter, margined and tipped with rose-mauve, puce and violet reflections, the longer plumes nearest the flanks with the outer webs only, mauve ; the loose and somewhat decomposed elongated flank-plumes reaching to beyond the under tail-coverts, light brown or of a pale fawn-brown tint, thighs black ; upper tail-coverts and tail below, black ; legs, feet, and bill black ; there is a rich sheen of rosy-mauve over the whole of the under surface from the lower part of the neck to the flanks, which shows a rose-lilac tint in certain lights, and is slightly deeper in tint on the lower side-plumes.



LABRICHTHYS CYANOG

B. vi. : D. 9/11 : A. 3/10 : V  
lat. 25 : L. trans. 3/9.

Length of head  $3\frac{3}{4}$ , of caudal fin 5;  
total length. *Eye*—Diameter  $5\frac{3}{8}$  in  
diameters from the end of the snout,  
space convex : upper profile of head  
eyes : jaws equal ; maxilla extends to  
*Teeth*—Lower jaw with a row of strong  
pair very large, the others growing small  
ramus ; a row of similar, but much smaller  
upper jaw with a similar dentition, except  
teeth in each ramus are rather large  
preceding them, and the hinder row  
posterior canine strong. *Fins*—Dorsal  
last the longest,  $\frac{2}{3}$  of the length of the head  
the rays. Anal commences beneath the  
third spine is the longest, about  $\frac{1}{2}$  of the  
half that of the longest ray. Pectorals  
to opposite the 8th scale of the lateral line  
the head. Ventrals about equal in length  
reaching to the vent. Caudal round  
cycloid, and adherent. *Cheeks*—

fins; the second, not so well defined, on the free portion of the tail. Head greenish-blue above; opercles and cheeks lilac; intermandibular space indigo-blue. Dorsal and anal fins violet, the spinal part of the former tinged with yellow; caudal dull yellowish-brown, with the webs purple, and the outer angles brighter yellow. Ventrals and pectorals orange, the latter with a broad dark blue basal band. Irides golden.

The magnificent *Labrichthys* which we here describe, measures over 18 inches, and was captured in Broken Bay on the 12th instant. The stomach was crammed with the broken fragments of shells, including small oysters, *Patella*, and *Tapes*. Its flesh, even though labouring under the disadvantage of having been skinned, was excellent. Register number, I. 1245.

with Mr. Whitelegge he told me that the Museum grounds he found twelve specimens on one occasion Mr. Ogilby had found six and Haswell also found specimens in the same place quite recently I have received one from Marrickville.

That these planarians should have been found so often in so many places is probably coincidental it is not clear whether this was mere chance or whether the damp warm weather was favourable to them, or whether they were coming forth in search of each other for food, or possibly being with them, as it is with the planarians, about the time of the year when the species of slug was very abundant about the same situations.

The specimens I saw in Hyde Park were found in the enclosure about Capt. Cook's statue and with plants from the Botanic Garden they doubtless obtained a footing. Those few exceptions, in the vicinity of gardens and flower beds they must have travelled considerable distances.

Their appearance on the pavements in a moribund or dried-up condition—and on the footpaths were in one or other of these

In respect of size some of our specimens are as large, if not larger than Professor Moseley's example, which was 9 inches long. I measured a living one, which, when extended, was 14 inches long. Eleven spirit specimens from the nursery referred to were from 4.2 to 12 cm. long and from 3.5 mm. broad anteriorly, diminishing posteriorly by about 1 mm.

In regard to colour, Sydney specimens agree with those examined by Professors Moseley and Bell in having the same number and arrangement of longitudinal bands, &c., but I notice in different living examples, and usually in different portions of the same animal, a considerable variation in the intensity of the colouring, as well as in the width of some of the stripes. Usually the stripes are uniformly darker and more intensely coloured in the anterior half or third of the body, and may frequently be described as black. The median stripe is sometimes a very fine line; at other times, even in the same animal, it becomes as wide as the first lateral band on each side. Further back, all the bands may uniformly become paler and dimmer, and assume a brownish tint, or the median and outer lateral bands may be conspicuously darker, while the inner bands fade to a darker shade of the ground colour or are hardly perceptible. In a young living specimen (46 mm. long and 2 mm. broad when extended) the outermost bands vanished altogether in the posterior region of the body. In one case the ground colour between the median and first lateral stripe on each side was of a conspicuously darker colour.

The anterior margin of the cheese-cutter-shaped head when the animal is crawling sends off inferiorly, sensory, papilla-like prolongations with which it touches the surface on which it is crawling, just as Humbert and Moseley describe in other species. In his remarks Professor Bell points out that, when the animal is in a state of torpid quiescence, the head is contracted and obtusely pointed, and he insists rather emphatically on this variation from the cheese-cutter form of the head which characterises the genus *Bipalium*. I have recently had the opportunity of examining a large number of land-planarians belonging to some twenty

Professor Bell's figures, or as mer description.

I have not noticed the oral and specimens, nor the latter even in the almost always everted, folded, rosette-like structure situated at more, of the animal's length behind two examples taken at random measurements respectively, the oral apertures were respectively from the anterior extre

The almost white ambulacral line on bordered on each side by an almost black the relatively long and strong cilia on ridge are readily seen when the under in an inverted watchglass is viewed where the cilia are more difficult to measure

The first living specimen I obtained with damp rotten wood, on April 1 noticed that it had begun to divide from about  $\frac{1}{4}$  inch to 2 inches long, round on the pieces of wood, or on the specimen was put into the jar on April

I kept the jar under observation until May 25th I turned out its contents

fragments which were developing new heads by its larger cheese-cutter-shaped portion, its more intensely pigmented upper surface, and the two black patches just behind the head formed by the fusion of the most anterior portions of the lateral stripes. The anterior portion of the first specimen was wanting, and was probably one of the dead portions. Thus such of the fragments as had not too recently separated, had acquired fairly well-developed new cheese-cutter-shaped heads in about thirty days ; whether in each case a new mouth and genital orifice had also formed was not apparent. A third specimen kept for several weeks maintained its bodily integrity.

...blue wings and flank |  
orange-crested bower-bird (*Amblyo*  
*Charmosyna Josephinæ*. The exhibit  
the base of the Astrolabe Range, an  
coast of New Guinea by Mr. Goldi  
Australian Museum.

Mr. Brazier exhibited photograph  
(*Idmonea Milneana*, and *I. interjuncta*  
Jackson, (8 fathoms), taken by Mr. .

Mr. A. Sidney Olliff of the A.  
specimens of *Alectoria superba*,  
remarkable genus of Orthoptera havi  
duced over the base of the elytra ; th  
by Mr. K. H. Bennett, at Mossiel, i  
species was originally described by Bru  
at Peak Downs.

Mr. C. S. Wilkinson exhibited for  
stone found at Murwillumbah, Tweed  
of a live box-tree six feet above the gr  
the lime had been taken up in some  
and had been thrown off in the form  
forming a stalactite. Also four 'water  
specimen an inch in diameter and con  
found on the Richmond River : and

Mr. Palmer exhibited specimens of the spider, at present undetermined, which fabricates the remarkable egg-bags, examples of which he had exhibited at the March Meeting of the Society.

Mr. Whitelegge exhibited examples of what were represented as early stages of the truffle, which had been sent by Mr. A. H. Cooper of Double Bay.

Mr. Macleay exhibited the fifty species of Insects described in his Paper.

Mr. Macleay also exhibited some grass infested by a minute grub, which lived in the stem and caused a thickening of it. He stated that the grass had been sent for examination under the belief that the prevalence at the present season of large numbers of worms in sheep, might in some way be traceable to the minute worms in the grass. A microscopical investigation by Dr. Katz had shown however that the worms in the grass were not Entozoa but maggots of minute Dipterous Insects, probably *Cecidomyiadae* or gall gnats, or possibly minute Muscidae of the Oscinides group. The habit of the insect somewhat resembled that of *Cecidomyia destructor*, Say, the "Hessian Fly," so destructive to wheat crops in America.

Mr. Macleay also exhibited for Professor Stephens a lemon grown by Mr. Long of Ryde, in which the carpels were separated as in the fingered orange, and another approaching the Horned or Navel Orange in having a supernumerary row of carpels.

Mr. Fletcher exhibited living specimens of *Bipalium kewense* referred to in his note.



MEMBERS EL.

Mr. William Lovegrove, 109 1  
Lockyer, were elected Members of

---

The Chairman announced that th  
during the ensuing month.

---

The Chairman also read a letter f  
the Royal Society of South Australia, c  
from the Council to Members of the  
to visit Adelaide at the end of August  
to hold meetings and excursions, par  
partly in addition to the Meeting

## DONATIONS.

**"Bulletin de la Société Zoologique de France pour l'année 1887."**

**Part 1. *From the Society.***

**"Comptes Rendus des Séances de l'Académie des Sciences, Paris."**

**Tome CIV. Nos. 10-12 (1887). *From the Academy.***

**"Zoologischer Anzeiger." X. Jahrg., Nos. 249-251 (1887).**

***From the Editor.***

**"Feuille des Jeunes Naturalistes." No. 199 (1887); "Catalogue de la Bibliothèque." Fasc. No. 1. *From the Editor.***

**"The Canadian Record of Science." Vol. II., No. 6 (1887).**

***From the Natural History Society, Montreal.***

**"The Journal of the Cincinnati Society of Natural History."**

**Vol. X., No. 1 (1887). *From the Society.***

**"Journal of the Elisha Mitchell Scientific Society for the year 1885-86." *From the Society.***

**"Proceedings of the Canadian Institute, Toronto." 3rd Ser.**

**Vol. IV., Fasc. 2 (1887). *From the Institute.***

**"Bulletin of the American Geographical Society for 1886, No. 3;" Vol. XIX., No. 1 (1887). *From the Society.***

**"Bulletin of the Museum of Comparative Zoology at Harvard College." Vol. XIII., No. 3 (1887). *From the Curator.***

and 1885. (Two Vols.). *From the*

“ Archives Néerlandaises des S  
Tome XXI., Liv. 4me (1887). *Fr*  
*Sciences à Harlem.*

“ Journal of the Royal Microscop  
Vol. VI., 2nd Ser. Part 6a. (Suppl  
1886). *From the Society.*

“ The Transactions of the Entom  
the year 1887.” Part 1. *From the*

“ Abstracts of Proceedings of the Z  
5th and 19th April, and 3rd May, 18

“ Hausbau, Häuser und Siedelung  
Neu-Guinea ;” “ Canoes und Canoebs  
“ Catalog der Ausstellung für verg  
westlichen Südsee besonders der Deut  
*the Author, Dr. O. Finsch.*

“ Videnskabelig 25 11 11

"The Scottish Geographical Magazine." Vol. III., No. 5 (May, 1887). *From the Hon. W. Macleay.*

"The Victorian Naturalist." Vol. IV., No. 2 (June, 1887). *From the Field Naturalists' Club of Victoria.*

"Nova Acta der Ksl. Leop.-Carol. Deutschen Akademie der Naturforscher." Band XLVI. (No. 4), XLVII. (Nos. 2 and 3), XLVIII. (No. 1), L. (Nos. 1 and 2); "Leopoldina." 21 Heft, Jahrg. 1885. *From the Academy.*

"The Australasian Journal of Pharmacy." Vol. II., No. 18 (June, 1887). *From the Editor.*

"Report on the Tarawera Volcanic District." By Prof. F. W. Hutton, F.G.S. *From the Author.*

"Bulletin de la Société Impériale des Naturalistes de Moscou." Année 1886, No. 3. *From the Society.*

"Zur Kenntniss der Mammarorgane der Monotremen" von Prof. Carl Gegenbaur. *From Dr. O. Katz.*

"Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia." 2nd Session (1886-7). Vol. II., Part 2. *From the Society.*

"Geological and Natural History Survey of Canada—Annual Report." (New Series) Vol. I. (1885), with Maps and Sections. *From the Director.*

"The Fifteenth Annual Report of the Board of Directors of the Zoological Society of Philadelphia." *From the Society.*

seven or eight tubercles on the terg  
several smaller ones on the pleuræ.  
and very finely pitted, but the ante  
coarsely granulated, resembling the  
the free cheeks. The tubercles are  
of the thorax is rather more than fo

*Pygidium*.—Six segments only  
small tubercles on the tergal part a  
The surface is smooth, except toward  
scattered granules. The margin is  
granulated like that of the cheeks  
about an inch and a-half.

This species very closely resembles  
with *Homalonotus Herschellii* (M  
described and figured by Mr. Sal  
Series, Vol. VII., p. 215, pl. 24, figs.  
to be that our specimen is broader in  
segments are flatter and with more tu  
rostral and caudal portions are kno  
decided opinion on this point. At  
highly characteristic of the Lower De

## A LIST OF THE INDIGENOUS PLANTS OF THE MUDGEES DISTRICT.

BY ALEXANDER G. HAMILTON.

In my list of the Orchidæ of this district (Proc. Linn. Soc. of N.S.W., Vol. I., 2nd Ser. 1886, p. 865), I promised at some future time to furnish a list of the phænogamous plants and the ferns. That promise I now fulfil in the hope that it may be of some use in the elucidation of the question of the geographical distribution of species.

The remarks that applied to the distribution of orchids in this district, apply equally to the other families. The sandstone found on the Dividing Range supports the plants that are typical of the sandstone elsewhere. But there is, among the remaining families a greater proportion of species differing from the coast forms than is found among the orchids. These differing forms however, appear to be representatives of the coast plants.

In one or two sheltered spots there are many species not occurring elsewhere about Mudgee. For example, in a deep gully at Mullamuddy are found *Pittosporum undulatum*, *Eucalyptus globulus*, *Nicotiana suaveolens*, *Sambucus xanthocarpa*, *Sturmia reflexa*, *Dendrobium speciosum*, and *Pteris aquilina*, none of which occur generally over the district, although the last three grow at Cooyal, on the Dividing Range. Some other plants, rare elsewhere, are common in this ravine.

...section, showing an approxin  
plains ; but it is not at all marked till  
far beyond the limits of the Mudjee  
Mudjee the change to the sandstone  
the ordinary forms occurring right up t  
Range.

The remarks I made on the gradual  
of orchids apply with equal force to the  
vation, clearing, and the influx of int  
principal factors concerned in their di  
very noticeable in land ringbarked or ci  
ance and growth of aliens being then v  
not so potent an agent as might be thoug  
I collected *Euphrasia scabra* in a cleare  
residence. As it was so near, I neglecte  
and during the five dry years which foll  
to be found. The moist summer of 1886  
again in the same limited locality, so th  
existed with unimpaired vitality throu  
during which the paddock was more  
remark also applies to *Centrolepis fascic*  
after the same long interval in that local

It will be seen that I have included  
although I have already given a paper  
thought it would be better not to break  
the orders by leaving them out.

After the specific names, habitat, and period, month or season of flowering, the figures which follow are meant to indicate where the plant is found elsewhere besides the District of Mudgee. 1.—N.S.W. 2.—V. and N.S.W. 3.—N.S.W. and Q. 4.—V., N.S.W., and Q. 5.—T., V., N.S.W. and Q. 6.—S.A., T., V., N.S.W., and Q. 7.—N.S.W., Q., and N.A. 8.—S.A., V., N.S.W., and Q. 9.—W.A., S.A., T., V., N.S.W., and Q. 10.—W.A., S.A., T., V., N.S.W., Q., and N.A. 11.—T., V., and N.S.W. 12.—W.A., S.A., and N.S.W. 13.—W.A., S.A., V., N.S.W., Q., and N.A. 14.—S.A., N.S.W., Q., and N.A. 15.—W.A., S.A., V., N.S.W., and Q. 16.—S.A. and N.S.W. 17.—S.A., V., N.S.W., Q., and N.A. 18.—T. and N.S.W. 19.—S.A., V., and N.S.W. 20.—S.A., T., V., N.S.W., Q., and N.A. 21.—W.A., S.A., N.S.W., Q., and N.A. 22.—S.A., N.S.W., and Q. 23.—V., N.S.W., Q., and N.A. 24.—T., V., N.S.W., Q., and N.A. 25.—S.A., T., V., and N.S.W. 26.—W.A., S.A., T., V., and N.S.W. 27.—W.A., S.A., V., and N.S.W. 28.—W.A., S.A., V., N.S.W., and N.A. 29.—W.A., V., N.S.W., and Q. 30.—W.A. and N.S.W. 31.—W.A., N.S.W., and Q. 32.—W.A., V., N.S.W., Q., and N.A. 33.—W.A., S.A., T., and N.S.W.

## DICOTYLEDONEÆ.

### CHORIPETALEÆ HYPOGYNÆ.

- |                  |                   |
|------------------|-------------------|
| 1. RANUNCULACEÆ. | 15. GERANIACEÆ.   |
| 2. DILLENIACEÆ.  | 16. MALVACEÆ.     |
| 3. LAURACEÆ.     | 17. STERCULIACEÆ. |
| 4. PAPAVERACEÆ.  | 18. EUPHORBIACEÆ. |
| 5. CRUCIFERÆ.    | 19. URTICACEÆ.    |
| 6. VIOLACEÆ.     | 20. CASUARINEÆ.   |
| 7. PITTOPOREÆ.   | 21. SAPINDACEÆ.   |
| 8. DROSERACEÆ.   | 22. STACKHOUSIÆ.  |
| 9. ELATINÆ.      | 23. PORTULACEÆ.   |
| 10. HYPERICINÆ.  | 24. CARYOPHYLLÆ.  |
| 11. POLYGALÆ.    | 25. AMARANTACEÆ.  |
| 12. RUTACEÆ.     | 26. SALSOLACEÆ.   |
| 13. ZYGOPHYLLÆ.  | 27. POLYGONACEÆ.  |
| 14. LINEÆ.       | 28. NYCTAGINÆ.    |



**MONOCULUS, Linn.**

**LAPPACEUS, Sm.** Common all c  
Summer ; 9.

**RIVULARIS, Bks. & Sol.** Commo

**HIRTUS, Bks. & Sol.** ; 4.

**PARVIFLORUS, Linn.** On river f  
Spring ; 6.

## **DILLENIAC**

**HIBBERTIA, Andr.**

**STRICTA, R. Br.** On uplands &  
common ; Spring and Summ

**ACICULARIS, F.v.M.** Beaudesert,  
rare ; Spring ; 6.

**PEDUNCULATA, R. Br.** ; 2.

**LINEARIS, R. Br.** Cooyal ; 4.

**DIFFUSA, R. Br.** Everywhere ; c

**DENTATA, R. Br.** On foothills &  
Spring and Summer ; 4.

## **LAURACEA**

**CASSYTHA, Linn.**

**GLABELLA, R. Br.** Semiparasitic.

CRUCIFERÆ.

**NASTURTium**, R. Br.

**TERRESTRE**, R. Br. Common on lowlands ; Spring ; 6.

**CARDAMINE**, Tour.

**HIRSUTA**, Linn. Common on lowlands ; Spring ; 9.

**LEPIDIUM**, Tour.

**RUDERALE**, Linn. Common on lowlands ; Spring ; 10.

VIOLACEÆ.

**VIOLA**, Tour.

**BETONICIFOLIA**, Sm. All over district but not common ;  
September ; 6.

**HEDERACEA**, Labill. Cooyal only ; Spring to Autumn ; 6.

**HYBANTHUS**, Jacq.

**FILIFORMIS**, F.v.M. Cooyal and Home Rule ; Spring and  
Summer ; 4.

**HYMENANTHERA**, R. Br.

**BANKSII**, F.v.M. Cooyal, and here and there along bank of  
river ; rare ; 11.

PITTOSPOREÆ.

**PITTOSPORUM**, Bks.

**UNDULATUM**, Andr. A few trees at Mullamuddy ; October  
and November ; wood suitable for engraving ; 5.

**PHILLYROIDES**, DC. Two Mile Flat ; rare ; early Spring ; 13.

**BURSARIA**, Cav.

**SPINOSA**, Cav. Everywhere common ; Summer ; commonly  
called "Black-thorn ;" wood tough and said to be suitable  
for wood-engraving ; 10.

**MARIANTHUS**, Hueg.

**PROCUMBENS**, Benth. On stony ridges, Biraganbil, Beau-  
desert, Mullamuddy, Cooyal ; not common ; September  
and October ; 5.

**BILLARDIERA**, Sm.

**SCANDENS**, Sm. Common on rocky hills ; Spring ; 6.

**ANATA, Labill.** On moist at  
Summer ; 6.

**AURICULATA, Backh.** Everyw

**PELTATA, Sm.** Same as preced  
this family are said to be  
never known animals to ea  
freely in moist seasons whe  
I imagine losses from this

## **ELATINE**

**ELATINE, Linn.**

**AMERICANA, Arnott.** On wet  
Cudgegong River; Decemb

## **HYPERICUM**

**HYPERICUM, Tour.**

**JAPONICUM, Thunb.** Everywhe  
round ; 10.

## **POLYGALA**

**POLYGALA, Tour.**

**SIBIRICA, Linn.** Beaudesert Hil

**COMESPERMA, Labill.**

**SPHÆROCARPUM** Steud. ~

**BORONIA, Sm.**

**PINNATA, Sm.** Cooyal ; Spring and Summer ; 6.

**PHILOTHECA, Rudge.**

**AUSTRALIS, Rudge.** Cooyal ; two varieties, one narrow and the other wide-leaved ; Spring ; 3.

**CORREA, Sm.**

**SPECIOSA, Andr.** Home Rule, Cooyal, Goodaman ; Spring ; 6.

**GELJERA, Sch.**

**SALICIFOLIA, Sch.** Two Mile Flat ; 3.

**ZYGOPHYLLÆ.**

**TRIBULUS, L'Obel.**

**TERRESTRIS, L'Obel.** Everywhere on river flats ; Burrs known as "Bulldogs" from their strength and penetrating powers ; late Summer and Autumn ; 13.

**LINEÆ.**

**LINUM, Tour.**

**MARGINALE, Cunn.** Everywhere on hills ; very subject to a parasitic fungus (*Uredo lini*) ; Spring and Summer ; 9.

**GERANIACEÆ.**

**GERANIUM, Tour.**

**CAROLINIANUM, Linn.** Everywhere ; almost all through the year ; 9.

**ERODIUM, L'Hér.**

**CYGNORUM, Nees.** Everywhere on low grounds ; Spring to Autumn ; good feed ; 13.

**PELARGONIUM, L'Hér.**

**AUSTRALE, Willd.** Cooyal ; Spring ; 9.

**OXALIS, Linn.**

**CORNICULATA, Linn.** Everywhere ; all the year ; 9.

PAVONIA, Cav.

HASTATA, Cav. On river bank  
inconspicuous, and in Sun

HIBISCUS, Linn.

TRIONUM, Linn. Guntawang,  
often has green or incons  
ordinary coloured blossom

## STERCULLA

BRACHYCHITON, Sch. & Endl.

POPULNEUM, R. Br. Hills ;  
droughts ; produces a gum

## EUPHORBIA

EUPHORBIA, Linn.

DRUMMONDII, Bois. Everywher  
poisonous to sheep ; 10.

PORANTHERA, Rudge.

COBYMBOSA, Brongn. Guntawan

MICROPHYLLA, Brongn. Widely sp

PSEUDANTHUS, Sieb.

DIVARICATISSIMUS, Benth. Reedy

BERTYA, Planch.

**PHYLLANTHUS, Linn.**

**AUSTRALIS, J. Hook.** Common everywhere ; Spring and Summer ; 18.

**THYMOIDES, Sieb.** Rocky places ; Spring and Summer ; 19.

**ADRIANA, Gaud.**

**TOMENTOSA, Gaud.** On banks of rivers and creeks ; Summer ; eaten by cattle and horses ; sometimes called "Castor Oil ;" 13.

**URTICACEÆ.**

**FICUS, Tour.**

**RUBIGINOSA, Desf.** Home Rule, Warrable Hills, Mullamuddy, Cooyal, on mountains ; 3.

**PARIETARIA, Tour.**

**DEBILIS, G. Forst.** Rocky places ; rare ; 10.

**URTICA, Tour.**

**INCISA, Poir.** Mullamuddy and Appletree Flat ; 6.

**CASUARINEÆ.**

**CASUARINA, Rumph.**

**GLAUCA, Sieb.** On hills ; 8.

**STRICTA, Ait.**

**SUBEROSA, Otto & Diet.** On hills ; 5.

**CUNNINGHAMIANA, Miquel.** At river ; February and March ; in hard seasons all the species are cut down for feed for stock ; 3.

**DISTYLA, Vent.** Reedy Creek, Biraganbil ; Feb. and Mar. ; 26.

**SAPINDACEÆ.**

**DODONAEA, Linn.**

**TRIQUETRA, Wendl.** Biraganbil, Cullenbone, Cooyal ; known as "Wild hops ;" 4.

**VISCOSA, Linn.** Biraganbil and Beaudesert ; 10.

**LOBULATA, F.v.M.** Cullenbone ; Spring ; a very local species ; 12

**STACKHOUSIÆ.**

**STACKHOUSIA, Sm.**

**LINARIFOLIA, Cunn.** Guntawang ; Spring and Summer ; 6.

vegetable, and eaten by

## CARYOP.

STELLARIA, Linn.

PUNGENS, Brongn. On rocks

GLAUCA, With. Everywhere

FLACCIDA, Hk. As previous

MULTIFLORA, Hk. As previous

SAGINA, Linn.

APETALA, Linn. Everywhere

corded from N.S.W. in (

SCLERANTHUS, Linn.

BIFLORUS, J. Hk. Everywhere

SPERGULARIA, Pers.

RUBRA, Cambess. Guntawa

Summer ; 26.

POLYCARPON, Loeffl.

TETRAPHYLLUM, Loeffl. Every

suspected of killing lucer

England ; 9.

## AMARANT.

ALTERNANTHERA, Forsk.

TRIANDRA, Lam. Common ever

PTILOTHUS D. D.

**SALSOLACEÆ.**

**RHAGODIA, R. Br.**

**HASTATA, R. Br.** Everywhere; Spring to Autumn; good feed ;  
in bad seasons this and the two following plants are  
only to be found near fences, or in other places where  
they are protected from stock ; 4.

**NUTANS, R. Br.** As previous species ; 6.

**LINIFOLIA, R. Br.** As previous species ; 3.

**CHENOPODIUM, Tour.**

**TRIANGULARE, R. Br.** Everywhere ; Summer ; 3.

**CABINATUM, R.Br.** Everywhere ; Summer ; 15.

**ATRIPLEX, Tour.**

**SEMIBACCATUM, R. Br.** Everywhere ; Summer to Autumn ; 15.

**POLYGONACEÆ.**

**RUMEX, Linn.**

**BROWNII, Camp.** Marshy places ; common ; all the year ; 6.

**FLEXUOSUS, Sol.** Same as last species ; 16.

**POLYGONUM, L'Obel.**

**PLEBEJUM, R. Br.** Everywhere ; a troublesome weed ; nearly  
all the year ; 17.

**PROSTRATUM, R. Br.** River banks ; Summer and Autumn ; 9.

**HYDROPIPER, Linn.** Damp places ; Spring to Autumn ; 8.

**NYCTAGINEÆ**

**BOERHAAVIA, Vaill.**

**DIFFUSA, Linn.** Everywhere ; springs up in dry seasons, and  
for this reason is valuable, being liked by stock ; 13.



## LEGUMINOSÆ

## OXYLOBIUM, Andr.

ELLIPTICUM, R. Br. Cooyal ; Nove

TRILOBATUM, F.v.M. Cooyal ; Nov

## DAVIESIA, Sm.

LATIFOLIA, R. Br. Biraganbil, Cooy

" Wild hops " and used as a bitt

CORYMBOSA, Sm. Guntawang ; Twc  
mer ; 8.

SQUARROSA, Sm. General ; Spring ;

ULICINA, Sm. General ; Spring ; 6.

GENISTIFOLIA, Cunn. Beaudesert Hills

## PULTENÆA, Sm.

SCABRA, R. Br. Var. BILOBA ; 2.

MICROPHYLLA, Sieb. ; 3.

TERNATA, F.v.M. General on hills ; 5

STYPHELIODES, Cunn. ; 2.

INCURVATA, Cunn. Cooyal ; 1.

## DILLWYNIA, Sm.

ERICIFOLIA, Sm. Everywhere ; Spring

JUNIPERINA, Sieb. Two Mile Flat, Re

## BOSSIÆA, Vent.

**Hovea, R. Br.**

**LINEARIS, R. Br.** Cooyal ; Spring ; 1.

**HETEROPHYLLA, Cunn.** A common plant everywhere ; early Spring ; 6.

**LONGIFOLIA, R. Br.** Reedy Creek ; Spring ; 20.

**LONGIPES, Benth.** Munghorn and Cooyal ; Spring ; 3.

**Lotus, Tour.**

**AUSTRALIS, Andr.** Crooked Creek ; Spring ; 10.

**Psoralea, Linn.**

**PATENS, Lindl.** On river banks and flats ; Summer ; 13.

**Indigofera, Roy.**

**AUSTRALIS, Wild.** Everywhere through the district ; eaten by horses, although it has the reputation of being a very poisonous plant ; Spring ; 9.

**BREVIDENS, Benth.** On rocky ground ; Spring & Summer ; 21.

**Swainsona, Salisb.**

**GALEGIFOLIA, R. Br.** Home Rule and Cooyal ; Spring and Summer ; 3,

**CORONILLIFOLIA, Salisb.** Generally distributed through the district ; Spring and Summer ; said to be poisonous to sheep, affecting the brain ; the seeds are poisonous to fowls, and in one instance I knew of thirty fowls dying from eating the seeds ; 3.

**PHACOIDES, Benth.** Common everywhere ; Spring and Summer ; 13.

**PHACIFOLIA, F.v.M. ; 19.**

**OROBOIDES, F.v.M.** Everywhere ; Spring and Summer ; 22.

**MONTICOLA, Cunn.** As last species ; 3.

**FRASERI, Benth.** Eurunderee, Burrundulla, Mount Frome ; Spring ; 3.

**Zornia, Gmel.**

**DIPHYLLA, Pers.** Everywhere ; Spring to Autumn ; 7.

**Desmodium, Desv.**

**BRACHYPODUM, A. Gray ; 3.**

**VARIANS, Endl.** Guntawang, Cullenbone ; Spring ; 5.

CLANDESTINA, Wendl. Everywh  
KENNEDYA, Vent.

MONOPHYLLA, Vent. Everywhere  
usually called "Sarsaparilla"  
as a bitter, *Smilax* the true  
to this district ; 6.

CASSIA, Tour.

LÆVIGATA, Willd. I have not co  
but Dr. Woolls found it in th

SOPHERA, Linn. This plant altho  
flats at Wellington (45 miles  
not found here ; but when the  
Wellington a good deal of traf  
Guntawang from Wellington,  
made its appearance by the r  
duced ; it does not appear to th  
Wellington, where it is a nuisa

AUSTRALIS, Sims. Two Mile Flat, (C  
Summer ; 23.

ACACIA, Tour.

SICULIFORMIS, Cunn. Everywhere ;  
JUNIPERINA, Willd. Reedy Creek ;  
ASPARAGOIDES, Cunn. ; 1.

ARMATA, R. Br. Everywhere ; Apr  
VOMERIFORMIS, Cunn. Reedy Creek

**ACACIA, Tour.**

**GLADIIFORMIS**, Cunn. ; 1.

**AMORNA**, H. L. Wendl. Havilah, Mullamuddy ; September and October ; 2.

**HAKKOIDES**, Cunn. ; 19.

**SUAVEOLENS**, Willd. Cooyal ; 6.

**LINIFOLIA**, Willd. ; 3.

**LUNATA**, Sieb. ; Guntawang ; 4.

**BRACHYBOTRYA**, Benth. ; 19.

**MYRTIFOLIA**, Willd. One plant on the Beaudesert Hills is all I have ever seen of this species ; 9.

**ELONGATA**, Sieb. ; Cooyal ; 4.

**HOMALOPHYLLA**, Cunn. The wood being sought after, only a few plants remain near Morrowolga, Two Mile Flat ; 19.

**IMPLEXA**, Benth. ; 4.

**BINERVATA**, DC. ; 3.

**TRIPTERA**, Benth. Reedy Creek ; 3,

**LONGIFOLIA**, Willd. ; 6.

**GLAUCESCENS**, Willd. ; 3.

**SPECTABILIS**, Cunn. Cooyal ; 3.

**DISCOLOR**, Willd. All over district ; August and Sept. ; 24.

**DECURRENS**, Willd. Not at all plentiful, and it is rare to find it more than two or three inches in diameter ; a few large trees in one of Mr. Rouse's paddocks near Guntawang ; 6.

**ROSACEÆ.**

**RUBUS, Tour.**

**MOLUCCANUS**, Linn. Common ; rarely fruits ; 23.

**ACÆNA, Mut.**

**OVINA**, Cunn. Rare ; 9.

**SANGUISORBÆ**, Vahl. Common in moist place ; 6.

**CRASSULACEÆ.**

**TILLÆA, Mich.**

**VERTICILLARIS**, DC. ; 9.

**PURPURATA**, J. Hook. ; 26.

**RECURVA**, J. Hook. ; 9.

**SALICARIA**

**LYTHRUM**, Linn.

**SALICARIA**, Linn. In moist place  
mer ; 6.

**HALORAGIS**

**HALORAGIS**, R. & G. Forst.

**ELATA**, Cunn. ; 8.

**CERATOPHYLLA**, Zahlb. In stony  
and January ; 20.

**HETEROPHYLLA**, Brongn. Moist place

**TEUCRIOIDES**, A. Gr. ; 26.

**CERATOPHYLLUM**, Linn.

**DEMERSUM**, Linn. In the river ; 1

**CALLITRICHE**, Linn.

**VERNA**, Linn. ; 9.

**MYRTACEAE**

**CALYCOTHRIX**, Labill.

**TETRAGONA**, Labill. Common at  
but I know only of one place  
Spring and Summer ; 9.

**BÆCKEA**, Linn.

**CUNNINGHAMII**, Benth. A small  
near Biraganbil ; 1.

**LEPTOSPERMUM**, R. & G. Forst.

**LEPTOSPERMUM**, R. & G. Forst.

**CALLISTEMON, R. Br.**

**SALIGNUS, DC. Var. ANGUSTIFOLIUS.** Crooked Creek, Stony Creek near Two Mile Flat, Biraganbil; late in Summer; 6.

**MELALEUCA, Linn.**

**THYMIFOLIA, Sm.** Cooyal, Home Rule, Reedy Creek; Summer; 3.

**NODOSA, Sm.** Reedy Creek; 3.

**ANGOPHORA, Cav.**

**INTERMEDIA, DC.** Everywhere; timber rarely used; the majority of the trees flower in alternate years, generally about February; 4.

**EUCALYPTUS, L'Hér.**

**STELLULATA, Sieb.** I include this tree among our flora on the authority of Mr. C. Moore in an article on "Timbers of N.S.W." in "Industrial Progress of N.S.W.," 1870. It is also mentioned as from Mudjee in Mr. Arvid Nilson's "Timber Trees of N.S.W.," 1880; 2.

**MACRORRHYNCHA, F.v.M.** The stringy-bark commonest in the district; 2.

**CAPITELLATA, Sm.** Only found on sandstone as at Cooyal and Reedy Creek, and the Warrable Hills, Home Rule; 19.

**EUGENIODES, Sieb.** Recorded as from Mudjee by Dr. Woolls in a paper on "Eucalypts of County of Cumberland" in P.L.S. N.S.W. Vol. V. p. 491; 2.

**HÆMASTOMA, Sm. Var. MICRANTHA.** "Spotted Gum;" not common; 5.

**LEUCOXYLON, F.v.M.** "Red Ironbark;" common on slaty ridges; flowers usually red, but sometimes creamy white; 8.

**MELLIODORA, Cunn.** "Yellowbox;" common, but appears to flourish best on the river flats and uplands; timber good, invaluable as fuel; 2.

**POLYANTHEMA, Sch.** "Slaty-Gum;" common on ridges, where it does not attain a great size, but on flats at Tallewang it runs up into splendid trunks, which are much used in bridge-building, etc., the timber being considered very durable; bark smooth; 2.

“green white-box” or “greer  
and has small seed vessels :  
dery bluish leaves and larger  
distinction “grey white-box ;”  
On the lower foot hills both 1  
No. 1 flowers in April and Ma  
in the young plants, and No. 2  
It is probably *E. albens* (Mig.)  
united with *E. hemiphloia*, but  
they are distinct : the only poi  
bark. Both afford desirable  
fuel ; 8.

**SIDEROPHLOIA**, Benth. “White Iro  
considered by some timber-getter  
ironbarks ; but others hold an op  
**GLOBULUS**, Labill. Only at Mullam  
whence I have seen other spe  
boundaries I have mentioned ;  
the trees in October ; the seed  
freely ; 24.

**GONIOCALYX**, F.v.M. On the author  
mentions it in his work, “The ]  
1885 ; 19.

**STUARTIANA**, F.v.M. Known in v  
“Peppermint,” and at Cooyal as  
not good ; makes very bad

**EUCALYPTUS, L'Hér.**

**DEALBATA, F.v.M.** This, Dr. Woolls says, is regarded by some as a variety of the preceding, but I have little doubt that it is a good species. It is known as "White," or "Cabbage-gum"; useless for timber as it chips off and warps so much that, if bolted down, the bolts sink into the wood as it curls; Cooyal, Home Rule, Biraganbil.

**ROSTRATA, Schl.** "River Gum," "Yarrah;" grows only on river flats; some of the old trees of this species are perfect studies for the landscape painter, and a portfolio might be filled with "bits" of the most delightful kind on the Menah Flat alone, where the trees have a gnarly character with drooping foliage that I have not observed elsewhere; timber good, but in large logs almost impossible to burn; 13.

**TERETICORNIS, Sm.** "Blue Gum;" Reedy Creek, Two Mile Flat, Home Rule. Whatever doubts may exist as to the capabilities of the Mudjee district in other respects, it must be admitted to be unrivalled in the production of wool, and few districts, as will be seen from list above, excel it in producing hardwood. I think there is a great future before Mudjee in the matter of timber production, and those who have seen its forest-clad hills will, I am sure, agree with me;\* 4.

**METROSIDEROS, Bks.**

**GLOMULIFERA, Sm.** Collected by Dr. Woolls; 3.

**RHAMNACEÆ.****POMADERRIS, Labill.**

**LANIGERA, Sims.** Cooyal; Summer; known to settlers by the curious name of "Wild Quince;" 24.

---

\* In addition to the above Eucalypts, I have in my list *E. botryoides*, Sm., and *E. obliqua*, L'Heritier, but as I have forgotten the authority for including them, and can find no references to them in my notes, I thought it best not to include them, especially as both are coast-loving trees.



## ARALIACEA

PANAX, Linn.

SAMBUCIFOLIUS, Sieb. Near Apple  
muddy ; very rare ; 5.

## UMBELLIFER.

HYDROCOTYLE, Tour.

LAXIFLORA, DC. The only species  
but Dr. Woolls in an article o  
district in *Sydney Morning* &  
mentions having collected thre  
he does not name) ; known to  
nette ;" grows everywhere ; 8.

DIDISCUS, DC.

INCISUS, Hook. Cooyal only ; 3.

XANTHOSIA, Rudge.

PILOSA, Rudge. Cooyal only ; 5.

ACTINOTUS, Labill.

HELIANTHI, Labill. Beaudesert, Mud  
Cullenbone, etc.; on stony grou  
few blooms may be found up t  
this year there was a patch of se  
be seen quite white on the hills

ERYNGIUM, Tour.

**CRANTZIA**, Nutt.

**LINEATA**, Nutt. In marshy spots and along edge of the river ; 6.

**DAUCUS**, Tour.

**BRACHIATUS**, Sieb. Common but not plentiful ; 9

## SYNPETALEÆ PERIGYNÆ.

1. **OLACINÆÆ.**

2. **SANTALACEÆ**

3. **LORANTHACEÆ.**

4. **PROTEACEÆ.**

5. **THYMELEÆ.**

6. **RUBIACEÆ.**

7. **CAPRIFOLIACEÆ.**

8. **COMPOSITÆ**

9. **CAMPANULACEÆ.**

10. **CANDOLLEACEÆ.**

11 **GOODENIACEÆ**

### OLACINÆÆ.

**OLAX**, Linn.

**STRICTA**, R. Br. Cooyal ; 3.

### SANTALACEÆ.

**SANTALUM**, Linn.

**LANCEOLATUM**, R. Br. ; 21.

**OBTUSIFOLIUM**, R. Br. Crooked Creek, Guntawang ; Feb. ; 2.

**CHORETRUM**, R. Br.

**LATERIFLORUM**, R. Br. ; 2.

**CANDOLLEI**, F.v.M. ; 3.

**LEPTOMERIA**, R. Br.

**ACIDA**, R. Br. ; 4.

**OMPHACOMERIA**, Endl.

**ACERBA**, A. de Cand. These 4 species are all known as "Native Currant ;" scarce, rarely bearing fruit ; 2.

**EXOCARPUS**, Labill.

**CUPRESSIFORMIS**, Labill. Everywhere ; fruit ripe in February and March ; 9.

**STRICTA**, R. Br. Cullenbne ; rare ; October and on ; 25.

LONGIFLORUS, Desr. ; 7.

EXOCARPI, Behr. ; 13.

LINOPHYLLUS, Fenzl. Var. PARVUM

PENDULUS, Sieb. ; 13.

## PROTEACEA

ISOPOGON, R. Br.

PETIOLARIS, Cunn. Cooyal and Ho

PERSOONIA, Sm.

LINEARIS, Andr. Guntawang ; 4.

PINIFOLIA, R. Br. Guntawang ; 1.

REVOLUTA, Sieb. Guntawang ; 1.

CUNNINGHAMII, R. Br. Cooyal ; 1.

CHAMÆPEUCE, Lhot. Guntawang ; 2.

GREVILLEA, R. Br.

ILICIFOLIA, R. Br. I find this given

Woolfs in the list of Mudgee Pla

*Morning Herald* in 1872. In t

plants, however, its distribution

tralia and Victoria. It may p

synonym.

FLORIBUNDA, R. Br. Cullenbone c

limited locality and rare ; 4.

CINEREA, R. Br. Cooyal ; 1.

SERICEA, R. Br. Cooyal ; 1.

TRITERNATA, R. Br. Reedy Creek c

**LOMATIA, R. Br.**

**ILICIFOLIA, R. Br.** Cooyal ; 2.

**SILAIFOLIA, R. Br.** Cooyal ; called by settlers " Flowering fern ;" 3.

**BANKSIA, Linn.**

**MARGINATA, Cav.** Cooyal ; 25.

**THYMELEÆ.**

**PIMELEA, Bks. & Sol.**

**GLAUCA, R. Br.;** 6.

**COLLINA, R. Br.;** 4.

**LINIFOLIA, Sm.;** 5.

**CURVIFLORA, R. Br.;** 6.

These four species are generally distributed.

**RUBIACEÆ.**

**OPERCULARIA, Gaert.**

**HISPIDA, Spreng.** Beaudesert Hills and Cullenbone ; 2.

**DIPHYLLA, Gaert.** Cullenbone ; both flower in early Summer ; 3.

**POMAX, Sol.**

**UMBELLATA, Sol.** Everywhere on stony hills ; Spring ; 8.

**ASPERULA, Dod.**

**OLIGANTHA, F.v.M.** Everywhere ; 6.

**GALIUM, Dod.**

**UMBROSUM, Sol.;** 25.

**CAPRIFOLIACEÆ.**

**SAMBUCUS, Tour.**

**XANTHOCARPA, F.v.M.** Only in Mullamuddy gully ; Nov. ; 4.

**COMPOSITÆ.**

**LAGENOPHORA, Cass.**

**SOLENOGYNE, F.v.M.** Everywhere ; all the year round ; 3.

**BRACHYCOME, Cass.**

**DIVERSIFOLIA, Fisch. and Mey. ; and var. HUMILIS.** Everywhere ; early spring ; 25.

is the one to which Dr. Wc  
tion as a remedy for "blig  
(1oz. to a pint of water), it  
in reducing inflammation ;

CUNNINGHAMI, F.v.M. ; 27.

SENECIO, Tour.

LAVTUS, Sol. ; 9.

VAGUS, F.v.M. ; 2.

AUSTRALIS, A. Rich. ; 25.

ERECHTITES, Raf.

ARGUTA, DC. ; 9.

CYMBONOTUS, Cass.

LAWSONIANUS, Gaud. August and

CENTAUREA, Linn.

AUSTRALIS, Benth. & J. Hook. Ra

CREPIS, Linn.

JAPONICA, Benth. Everywhere ; a

## CAMPANULACE

LOBELIA, Linn.

SIMPLICICAULIS, R. Br. On hills ; s  
thick stem in Spring, and then  
comes on, having but slight roc  
store of nutriment in its stem t  
have often collect

**LOBELIA, Linn.**

**PURPURASCENS, R. Br.** Common on banks of river and creeks ; 8.

**ISOTOMA, R. Br.**

**AXILLARIS, Lindl.** Home Rule and Cooyal in crevices of rock ; easily transplanted and makes an admirable basket or rockwork plant, flowering freely for months ; 4.

**FLUVIATILIS, F.v.M.** On creek and river banks ; always in flower ; 6.

**WAHLENBERGIA, Schr.**

**GRACILIS, A. DC.** Everywhere ; always in flower ; 10.

**CANDOLLEACEÆ.**

**CANDOLLEA, Labill. (Stylidium Sw.).**

**GRAMINIFOLIA, Sw. ; 6.**

**LINEARIS, Sw. ;** both common everywhere ; early Spring ; 1.

**LARICIFOLIA, Rich.** Cooyal ; 3.

**LEEWEHNEKIA, R. Br.**

**DUBIA, Sond.** Common on uplands in early Spring ; 26.

**GOODENIACEÆ.**

**DAMPIERA, R. Br.**

**STRICTA, R. Br.** Cooyal ; Summer ; 25.

**GOODENIA, Sm.**

**DECURRENS, R. Br. ; 1.**

**GENICULATA, R. Br.** Cullenbone ; Crooked Creek ; 9.

**HEDERACEA, Sm.** Guntawang, on banks of river ; 4.

**HETEROPHYLLA, Sm.** Guntawang, on banks of river ; 3.

**HETEROMERA, F.v.M.** Common everywhere ; 19.

**PANICULATA, Sm.** Cooyal, Biraganbil, Home Rule ; 4.

PARADOXA, R. Br. Common everywh  
MACROCALYX, DeVr. As last species

SYNPETALEÆ HY.

- |                   |       |
|-------------------|-------|
| 1. GENTIANEÆ.     | 7. 8  |
| 2. PLANTAGINEÆ.   | 8. 1  |
| 3. PRIMULACÆ.     | 9. 1  |
| 4. MYRSINACEÆ.    | 10. 1 |
| 5. CONVULVULACEÆ. | 11. 1 |
| 6. SOLANACEÆ.     | 12. 1 |
| 13. EPACRIDÆ.     |       |

GENTIANEÆ.

SEBÆA, Sol.

OVATA, R. Br. Common everywh  
species and the next contain a l  
sometimes used in cases of diar

ERYTHRÆA, Pers.

AUSTRALIS, R. Br. Flowers a little l  
species, and up till April ; 10.

PLANTAGINEÆ

PRIMULACEÆ.

SAMOLUS, Tour.

VALERANDI, Linn. On river banks and in moist places ;  
Spring ; 4.

MYRSINACEÆ.

MYRSINE, Linn.

VARIABILIS, R. Br. Cooyal ; 4.

CONVOLVULACEÆ.

CONVOLVULUS, Tour.

ERUBESCENS, Sims. Common everywhere ; Spring to Au-  
tumn ; 9.

DICHONDRA, R. and G. Forst.

REPENS, R. and G. Forst. Common everywhere ; 10.

SOLANACEÆ.

SOLANUM, Tour.

NIGRUM, Linn. Common everywhere ; Spring to Autumn ;  
spreads in cultivated ground ; 10.

AVICULARE, G. Forst. ; 6.

VERBASCIFOLIUM, Linn. ; 3.

STELLIGERUM, Sm. ; 3.

CAMPANULATUM, R. Br. ; 3. The last two species I have  
found only at Mullamuddy.

CINEREUM, R. Br. Everywhere, but not common ; 3.

NICOTIANA, Tour.

SUAVEOLENS, Lehm. Only at Mullamuddy ; October ; 13.

SCROPHULARINEÆ.

MIMULUS, Linn.

GRACILIS, R. Br. On banks and creeks all through the  
district ; Spring to Autumn ; 17.

REPENS, R. Br. Biraganbil, muddy flats ; 9.

PROSTRATUS, Benth. Biraganbil, in moist places ; 8.

GRATIOLA, Rupp.

PEDUNCULATA, R. Br. ; 15.



September and October ; said  
formations ; 2.

PLEBEJA, R. Br.; 5.

SERPILLIFOLIA, Linn. On flats ; I  
believe this is considered an  
grows luxuriantly on flats at a  
1500 or 1600 feet above sea-le

EUPHRASIA, Tour.

BROWNII, F.v.M.; 9.

SCABRA, R. Br.; 9.

## BIGNONIACEA

TECOMA, de Juss.

AUSTRALIS, R. Br. Two Mile Flat, E  
September and October ; 17.

## ASPERIFOLIÆ

MYOSOTIS, Rupp.

AUSTRALIS, R. Br.; 26.

SUAVEOLENS, Poir.; 11.

CYNOGLOSSUM, Tour.

SUAVEOLENS, R. Br.; 25.

AUSTRALE, R. Br.; 6.

T. ADIATUM

**MENTHA, Tour.**

**LAXIFLORA**, Benth.; 2.

**AUSTRALIS**, R. Br.; 20.

**SATUREJOIDES**, R. Br.; 9.

All grow on low grounds and all alike known as "Pennyroyal."

**LYCOPUS, Tour.**

**AUSTRALIS**, R. Br. Among reeds on bank of river; Summer; 6.

**SALVIA, Linn.**

**PLEBEJA**, R. Br.; 4.

**SCUTELLARIA, Herm.**

**MOLLIS**, R. Br. In stony places; Spring and Summer; 2.

**PROSTANTHERA, Labill.**

**LINEARIS**, R. Br. Two Mile Flat; I have seen only one plant of this species; Dr. Woolls collected three species of this genus at Cooyal, but does not give names; 1.

**AJUGA, Linn.**

**AUSTRALIS**, R. Br. Everywhere on hills; 6.

**VERBENACEÆ.**

**SPARTOTHAMNUS, Cunn.**

**JUNCEUS**, Cunn. Reedy Creek and Cooyal; 3.

**VERBENA, Tour.**

**OFFICINALIS**, Linn. In moist places everywhere; August to May; 6.

**MYOPORINÆ.**

**MYOPORUM, Bks. & Sol.**

**TENUIFOLIUM**, G. Forst.; 23.

**MONTANUM**, R. Br. On hills; Spring and Summer; 13.

**DEBILE**, R. Br. On stony foothills; 3.

**EPACRIDEÆ.**

**STYPHELIA, Sol.**

**LÆTA**, R. Br. April to August; known as "Five Corner;" 1.

**VIRIDIS**, Andr. Cooyal only, collected by Mr. Percy Williams; 8.

- VIRGATA, Labill. Cooyal; 25.  
 ATTENUATA, F.v.M. Cooyal; 1.  
 ERICOIDES, Sm. Cooyal; 6.  
 ELLIPTICA, Sm. Cooyal; 5.  
 SCOPARIA, Sm. Cooyal; 5.  
 BRACHYLOMA, Sond.  
 DAPHNOIDES, Benth. Everywhere; 84  
 EPACRIS, Cavan.  
 CRASSIFOLIA, R. Br. On wet rocks, 6  
 in flower; 1.  
 APICULATA, Cunn. Cooyal; 1.  
 DRACOPHYLLUM, Labill.  
 SECUNDUM, R. Br. Cooyal; 1.

## APETALEÆ GYMNOSE

### 1. CONIFERÆ.

2. C

### CONIFERÆ.

CALLITRIS, Vent.

VERRUCOSA, R. Br. Everywhere on hills

CONFIDENTIAL

## MONOCOTYLEDONEÆ.

### CALYCEÆ PERIGYNÆ.

1. ORCHIDEÆ.

3. HYDROCHARIDEÆ.

2. IRIDEÆ.

4. AMARYLLIDEÆ.

### ORCHIDEÆ.

**STURMIA**, Reich.

**REFLEXA**, F.v.M. Cooyal and Mullamuddy ; June to September ; 3.

**DENDROBIUM**, Sw.

**SPECIOSUM**, Sm. Cooyal, Mullamuddy ; October and November ; 4.

**TERETIFOLIUM**, R. Br. Cooyal ; 3.

**DIPODIUM**, R. Br.

**PUNCTATUM**, R. Br. Cooyal ; December and January ; 20.

Var. **HAMILTONIANUM**, Bailey. Guntawang ; November to January ; 3.

**CYMBIDIUM**, Sw.

**SUAVE**, R. Br. Collected by Dr. Woolls ; 3.

**THELYMITRA**, R. & G. Forst.

**LONGIFOLIA**, Forst. Common everywhere ; September and October ; 9.

**MEGCALYPTRA**, R.D.F. Generally distributed ; September and October ; 1.

**NUDA**, R. Br. ; 5

**DIURIS**, Sm.

**AUREA**, Sm. September and October ; 3.

**MACULATA**, Sm. Everywhere ; September and October ; 6.

**PEDUNCULATA**, R. Br. Everywhere ; August & Sept. ; 25.

**ABBREVIATA**, F.v.M. A hill-loving species ; October and November ; 3.

ALBA, R. Br. Cooyal ; September ; 3.  
 CÆRULEA, R. Br. Common ; August to  
 CHILOGLOTTIS, R. Br.  
 FORMICIFERA, R.D.F. Cooyal ; September  
 TRAPEZIFORMIS, R.D.F. Guntawang, 1  
 Cullenbone ; September and October  
 GLOSSODIA, R. Br.  
 MAJOR, R. Br. Everywhere ; August to

## IRIDEÆ.

PATERSONIA, R. Br.  
 SERICEA, R. Br. On low hills ; 4.

## HYDROCHARIDEÆ.

HALOPHILA, Thou.  
 OVATA, Gaud. In River ; 6.  
 OTTELIA, Pers.  
 OVALIFOLIA, L. C. Rich. In River ; 13.  
 VALLISNERIA, Linn.  
 SPIRALIS, Linn. In River ; 20.

## AMARYLLIDEÆ.

THAMNOCORIS

## CALYCEÆ HYPOGYNÆ.

- |               |                |
|---------------|----------------|
| 1. LILIACEÆ.  | 5. ALISMACEÆ.  |
| 2. TYPHACEÆ.  | 6. COMMELINEÆ. |
| 3. LEMNACEÆ.  | 7. JUNCÆ.      |
| 4. FLUVIALES. | 8. RESTIACEÆ.  |

### LILIACEÆ.

#### DIANELLA, Lam.

LONGIFOLIA, R. Br. ; 6.

REVOLUTA, R. Br. ; 9.

CÆRULEA, Sims. ; 3.

#### EUSTREPHUS, R. Br.

BROWNII, F.v.M. Cooyal ; Summer ; 4.

#### GEITONOPLESIMUM, Cunn.

CYMOSUM, Cunn. Cooyal ; 4.

#### WARMBEA, Thun.

DIOICA, F.v.M. Everywhere ; two varieties ; August ; 9.

#### BULBINE, Linn.

BULBOSA, Haw. Common everywhere ; August to October or later ; 6.

#### THYSANOTUS, R. Br.

PATERSONI, R. Br. On hills ; Summer ; rare ; 26.

JUNCEUS, R. Br. Everywhere ; November to January ; 1.

#### CÆSIA, R. Br.

VITTATA, R. Br. ; 6.

#### TRICORYNE, R. Br.

ELATIOR, R. Br. Everywhere ; Spring and Summer ; 9.

#### STYPANDRA, R. Br.

GLAUCA, R. Br. Flowers in spring on rocky hills ; 29.

Common on f  
XEROTES, R. Br.

LONGIFOLIA, R. Br.; 6.

BROWNII, F.v.M.; 17.

THUNBERGII, F.v.M.; 8.

FLEXIFOLIA, R. Br. All on poor

LEUCOCEPHALA, R. Br. On flat  
in May; 8.

XANTHORRHŒA, Sm.

ARBOREA, R. Br. On rocky range

## TYPHACEÆ

TYPHA, Tour.

ANGUSTIFOLIA, Linn. On margin (

SPARGANIUM, Tour.

ANGUSTIFOLIUM, R. Br. On margin

## LEMNACEÆ

LEMNA, Linn.

OLIGORRHIZA, Kurz.; 17.

POLYRRHIZA, Linn.; 2.

## FLUVIALES.

TRIGLOCHIN, Riv.

PROCERA, R. Br.; 10.

POTAMOGETON, Fuchs.

NATANS, Linn.; 9.

COMMELINEÆ.

COMMELINA, Plum.

CYANEA, R. Br. On sandy banks of rivers, and in one instance on a basaltic point near Guntawang; late in Summer; 7.

JUNCEÆ.

LUZULA, DC.

CAMPESTRIS, DC. On lowlands; Spring; 9.

JUNCUS, Tour.

BUFONIUS, Linn.; 9.

HOMALOCAULIS, F.v.M.; 19.

COMMUNIS, E. Mey.; 9.

PALLIDUS, R. Br.; 9.

PRISMATOCARPUS, R. Br.; 9.

RESTIACEÆ.

CENTROLEPIS, Labill.

FASCICULARIS, Labill.; 25.

ACALYCEÆ HYPOGYNEÆ.

1. CYPERACEÆ.

2. GRAMINEÆ.

CYPERACEÆ.

KYLLINGIA, Rottb.

MONOCEPHALA, Rottb.; 22.

CYPERUS, Tour.

GRACILIS, R. Br.; 8.

DIFFORMIS, Linn.; 13.

CONCINNUS, R. Br.; 4.

VAGINATUS, R. Br.; 13.

FULVUS, R. Br.; 22.

CARINATUS, R. Br.; 7.

ORNATUS, R. Br.; 3.

CONGESTUS, Vahl.; 30.



COMMUNIS, Kunth ; 17.  
 SCIRPUS, Tour.  
 SETACEUS, Linn. ; 9.  
 SCHOENUS, Linn.  
 IMBERBIS, R. Br. ; 2.  
 BROWNII, Hook.  
 BREVIFOLIUS, R. Br. ; 15.  
 CLADIUM, R. Br.  
 TERETIFOLIUM, R. Br. In water  
 MICROSTACHYUM, F.v.M. ; 2.  
 CAUSTIS, R. Br.  
 FLEXUOSA, R. Br. Known as "  
 brooms ; Cooyal only ; 23.  
 CAREX, Rupp.  
 INVERSA, R. Br. ; 9.  
 PANICULATA, Linn. ; 9.  
 PSEUDO-CYPERUS, Linn. ; 9.

# GRAMINEA

ERIOCHLOA, Humb.  
 ANNULATA, Kunth ; Reedy Creek ;  
 PASPALUM, Linn.  
 DISTICHUM, Linn. ; 31.  
 PANICUM, Tour.  
 SANGUINALE, Linn. ; 32.  
 LEUCOPHÆUM, Humb. . o

**IMPERATA, Cyr.**

ARUNDINACEA, Cyr. On river banks ; 10.

**ERIANTHUS, L. C. Rich.**

FULVUS, Kunth ; 21.

**HEMARTHRIA, R. Br.**

COMPRESSA, R. Br. Cullenbone, Gulgong ; rare ; 9.

**ANDROPOGON, Roy.**

SERICEUS, R. Br. ; 13.

REFRACTUS, R. Br. ; 23.

MONTANUS, Roxb. ; 23.

HALEPENSIS, Sib. & Sm. ; 31.

AUSTRALIS, Spreng. ; 23.

**ANTHISTIRIA, Linn.**

CILIATA, Linn. fil. This year this grass has attained a luxuriance seldom seen ; I collected numbers of stalks over 7 feet in height ; 10.

**ALOPECURUS, Linn.**

GENICULATUS, Linn. ; 9.

**ARISTIDA, Linn.**

BEHRIANA, F.v.M. ; 8.

**STIPA, Linn.**

SEMIBARBATA, R. Br. ; 9.

**DICHELACHNE, Endl.**

CRINITA, J. Hook. ; 9.

SCIUREA, J. Hook. ; 6.

**ECHINOPOGON, Palis.**

OVATUS, Palis. Rare ; 9.

**PAPPOPHORUM, Schr.**

COMMUNE, F.v.M. ; 13.

**SPOROBOLUS, R. Br.**

VIRGINICUS, Humb. & Kunth ; 13.

INDICUS, R. Br. ; 15.

LINDLEYI, Benth. ; 15.

**AGROSTIS, Linn.**

SOLANDRI, F.v.M. ; 9.

POA, Linn.

CÆSPITOSA, G. Forst.; 9.

ERAGROSTIS, Palis.

TENELLA, Palis.; 17.

LEPTOSTACHYA, Steud. ; 3.

BROWNII, Nees, vars. INTERRUPT  
of these two varieties has  
each year ; at present large  
covered with it, but neither  
it ; 13.

SETIFOLIA, Nees ; 21.

AGROPYRON, Gaert.

SCABRUM, Palis. ; 9.

ARUNDO, Tour.

PHRAGMITES, Dod. Forms de  
the water is shallow ; eaten

## ACOTYLEDON

### ACOTYLEDONEÆ V

#### 1. RHIZOSPERMÆ

#### RHIZOSPERMÆ

AZOLLA, Lam.

FILICES.

**OPHIOGLOSSUM**, Tour.

**VULGATUM**, C. Bauh. On basaltic flats, Guntawang ; fruit in winter ; 20.

**HYMENOPHYLLUM**, Sm.

**TUNBRIDGENSE**, Sm. Cooyal and Mullamuddy ; very rare ; 5.

**GLEICHENIA**, Sm.

**CIRCINATA**, Sw. On moist rocks at Cooyal ; 20.

**FLABELLATA**, R. Br. At " The Drip " Cooyal ; 5.

**OSMUNDA**, Tour.

**BARBARA**, Thunb. Cooyal, in swampy ground and on sandstone rocks ; 6.

**DAVALLIA**, Sm.

**PYXIDATA**, Cav. Growing in crevices of sandstone rocks, Cooyal ; 4.

**DUBIA**, R. Br. General in valleys at Cooyal ; 5.

**ADIANTUM**, Tour.

**AETHIOPICUM**, Linn. Generally distributed but not plentiful ; 9.

**AFFINE**, Willd. Cooyal ; very rare ; 3.

**HISPIDULUM**, Sw. Cooyal ; rare ; 4.

**CHEILANTHES**, Sw.

**DISTANS**, A. Br. Everywhere ; common ; 15.

**TENUIFOLIA**, Sw. Common everywhere, but most luxuriant on a hill near Beaudesert ; 10.

**PTERIS**, Linn.

**FALCATA**, R. Br. Beaudesert Hills, Mullamuddy, Cooyal ; 5.

**ARGUTA**, Ait. At Springfield in old diggers'-holes and wells, at Cooyal and Mullamuddy, in crevices of rocks ; 5.

**AQUILINA**, Linn. Mullamuddy, Warrable Hills, Reedy Creek, Cooyal ; 9.

**INCISA**, Thunb. Cooyal ; 6.

**COMANS**, G. Forst., and var. **ENDLICHERIANA**. Cooyal only ; 5.

ASPERA, Mett. Cooyal ; 4.  
 CAUDATA, Cav. Mullamuddy &  
 ASPLENIUM, Linn.  
 FLABELLIFOLIUM, Cav. Everyw  
 POLYPODIUM, Tour.  
 SERPENS, G. Forst. Cooyal on  
 muddy ; 4.  
 PUNCTATUM, Thunb. Cooyal—  
 GRAMMITIS, Sw.  
 RUTIFOLIA, R. Br. Everywhere  
 LEPTOPHYLLA, Sw. Beaudesert  
 spots ; 26.  
 PLATYCERIUM, Desv.  
 ALICORNE, Desv. I was rather  
 clump of this plant growing  
 Cooyal ; since I first saw it,  
 gardens, etc., so that I supp  
 district ; 3.

---

Comparing the above list with Dr. 's  
 to the Neighbourhood of Sydney," it  
 County of Cumberland the numbers st  
*Characeæ* which are not included in my

	ORDERS
DICOTYLEDONS .....	83

while in Mudgee there are only :—

	ORDERS	GENERA	SPECIES
DICOTYLEDONS.....	63	196	401
MONOCOTYLEDONS.....	14	79	164
ACOTYLEDONS.....	2	17	31
Totals.....	79	292	596

The following 28 Orders occur in Cumberland, but not in Mudgee :—*Nymphaeaceæ*, *Magnoliaceæ*, *Anonaceæ*, *Monimiaceæ*, *Menispermææ*, *Tremandraceæ*, *Meliaceæ*, *Tiliaceæ*, *Viniferaæ*, *Celastrineæ*, *Ficoideæ*, *Saxifrageæ*, *Passifloreæ*, *Cucurbitaceæ*, *Loganiaceæ*, *Sapotaceæ*, *Ebenaceæ*, *Jasmineæ*, *Apocynææ*, *Asclepiadeæ*, *Lentibularineæ*, *Acanthaceæ*, *Philydreæ*, *Xyrideæ*, *Palmaæ*, *Aroideæ*, *Eriocaulææ*, and *Lycopodineæ*.

There are only two Orders found in Mudgee which do not extend to Cumberland, viz., *Nyctagineæ* and *Zygophylleæ*.

Cumberland has 209 Genera not found in Mudgee, while Mudgee has but 24 not found in Cumberland, as follows :—*Cheiranthera*, *Tribulus*, *Sagina*, *Trichinium*, *Euzolus*, *Boerhaavia*, *Psoralea*, *Ceratophyllum*, *Colletia*, *Daucus*, *Crantzia*, *Gnaphaloides*, *Mineria*, *Ammobium*, *Angianthus*, *Centaurea*, *Crepis*, *Levenhoeckia*, *Sparganium*, *Dryoxia*, *Sorghum*, *Erianthus*, *Alopecurus*, and *Oswunda*, having in all 28 species.

In the following leading Orders the numbers of Mudgee and Cumberland species are as indicated :—

	MUDGEE	CUMBERLAND
LEGUMINOSÆ .....	67	113
ORCHIDÆ .....	59	77
COMPOSITÆ .....	54	65
GRAMINÆ .....	38	73
FILICES .....	29	58
MYRTACEÆ .....	28	69
LILIACEÆ .....	23	28
CYPERACEÆ .....	23	43
EPACRIDÆ .....	17	28
PROTEACEÆ .....	16	51
SCROPHULARIÆ .....	11	9

...  
 RHAMNACEÆ ...  
 STERCULIACEÆ ...  
 LAURACEÆ ...

The following species are extreme here :—*Pittosporum undulatum*, *Acaulus*, *Sambucus xanthocarpa*, *Solanum latum*, *Nicotiana suaveolens*, *Wood* muddy; *Pittosporum phillyroides*, *Gei* *thera linearis* at Two Mile Flat; *Hamiltonii*, *Pterostylis striata* and *Cal* desert Hills; *Baeckia Cunninghamii* : Biraganbil; *Dodonæa lobulata*, *Exoca* *floribunda* at Cullenbone; and *Acacia tr* at Reedy Creek. Cooyal has about where in the district.

Doubtless there are many more spec over the district which I have not suc I should meet with such I will include paper at some future time.

If any member of the Linnean Socie the indigenous plants round Wellinto very interesting to compare with the abo be of great service in making out the g tralian plants. More would be learned local floras not f-

# THE INSECTS OF THE CAIRNS DISTRICT, NORTHERN QUEENSLAND. PART II.

*(Continued from page 238).*

BY WILLIAM MACLEAY, F.L.S., &c.

## HETEROMERA.

### Family TENEBRIONIDÆ.

#### Sub-Family HELÆIDES.

#### 51. PTEROHELÆUS FUSILLUS.

Ovate, moderately convex, black; the legs, palpi and antennæ piceous. Head subnitid, showing under a powerful lens minute punctures; the clypeus large, somewhat elevated and convex at the apex, and almost semi-circular behind, with the suture rather indistinct except at the sides. Thorax subnitid, very minutely punctured, twice as broad as long, narrowly beaded all round, semi-circularly emarginate in front, the anterior angles produced, the sides roundly widening to the base and largely and rather flatly margined, the posterior angles acute, the base lightly bisinuate and fitting exactly to the base of the elytra, with a short transverse depression on each side of the middle near the base. Elytra of a dull black, very little wider than the base of the thorax, and about thrice its length, coarsely punctured; the punctures placed very irregularly in generally double rows with some of the interstices slightly elevated; the foliate recurved lateral margins without punctures but minutely rugose. The abdominal segments are nitid and longitudinally rugose, the terminal segment is piceous.

Length,  $4\frac{1}{2}$  lines.

*Hab.*—Barron River.



...distinct suture. Thorax less than the head, broader than long, the anterior angles slightly prominent, widening a little to the base, the posterior angles broadly lobed in the middle, with a circular depression. Elytra wider than three times the length, and convex, with an abbreviated scutellar one with punctures, becoming smaller and in the basal portions of the metasternum are rugosely punctate. The last joint longer than the other three combined.

Length, 8 lines.

*Hab.*—Mossman River.

This species seems to approach nearest to *Waterhouse*.

#### Genus PARAPHAN

Eyes free from the thorax. Prosternum keeled along its entire length. Mesoscutum circularly incised in front. Epipleuræ narrow. Antennæ of medium length, the joints broader than the others. In other respects

With all my anxiety to avoid adding to a group already, as I feel inclined to do, I am compelled to form this genus below. Mr. Pascoe, who has

value, I had no alternative but to add another genus. Beyond the characters given above of the genus, there are other peculiarities in the insect, which might claim to be of generic importance, but I am and always have been averse to limiting too much the range of a genus by giving it a too limited definition. But all these peculiarities are included in the following specific description.

53. *PARAPHANES NITIDUS*.

Oblong, convex, brassy-brown, very nitid. Head finely punctate; eyes large, transverse, touching, but not covered by, the thorax, not approximate in front, the clypeal suture almost straight, the clypeus transverse, broadly and slightly rounded in front and recurved on the sides where it is produced a little over the eye; labrum short, transverse. Antennæ longer than the head and thorax united, the first joint rather large, the second about one-third the length of the third, the third nearly twice the length of the fourth, the rest of about equal length but broader and flatter. Thorax transverse, minutely punctate, much emarginate in front, the anterior angles produced and rounded, the sides slightly rounded and margined, the margins flattened out at the anterior and posterior angles where they are coarsely punctured, the posterior angles very acute and the base broader than the apex and lobed in the middle. Scutellum curvilinearly triangular, depressed in the middle and minutely punctate. Elytra of the same width as the base of the thorax, and more than three times the length, convex in the middle, besinuate at the base, narrowed a little to the apex, and covered with numerous rows of small rather irregular punctures becoming less distinct towards the apex and with a deep impression near each side a little behind the humeral angle. The under surface is nitid and minutely punctate, and very minutely rugose. The legs are moderately stout, the thighs much swollen towards the apex, the tibiæ densely punctate, the punctures setigerous; the last joint of the tarsi as long as all the others united.

Length, 6 lines.

*Hab.*—Mossman River.

about twice as  
anterior angles very prominent, pos  
rounded and broadly margined, the l  
apex, broadly lobed in the middle and  
side of the lobe. Scutellum rounde  
than the thorax and nearly four tin  
covered with rows of rather large  
running into one another, and some  
others a little short of the apex. The  
very coarsely punctured. There is a de  
beneath the mentum. The abdomina  
rugose. The incision on the apex of the  
The hind tibiæ are long and slender,  
posterior tarsi is scarcely as long as the

Length, 7 lines.

*Hab.*—Mossman River.

#### 55. DECIALMA STRIATOP

Of rather elongate form, moderately  
elytra purplish black. Head minutely p  
eyes distant. Antennæ short, yellowish  
broader than long. Thorax broader t  
rather thinly punctate, the anterior angle  
sides lightly rounded and narrowly marg  
square, and the base slightly broader th  
higman

has an elongate oval groove along its whole length, there is an impressed line in the middle of the metasternum, the abdominal segments are finely punctate, the tarsi and tips of the tibiæ are yellow and pubescent.

Length,  $4\frac{1}{2}$  lines.

*Hab.*—Russell River.

#### 56. DECIALMA VIRIDIPENNIS.

This species very much resembles the last. It is much smaller, rather more convex, and is elongate-ovate. The head is black and densely and finely punctate, the clypeus nearly as long as the head and smooth; the antennæ reddish and like those of *D. striatopunctata*. Thorax transverse but less so than in the previous species, in other respects resembling it. Elytra dark metallic green with purplish reflections, very nitid, 8-striate, the striæ regularly punctate, a short sutural stria. The under surface like *D. striatopunctata*, the tarsi less yellow and less pubescent.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Mossman River.

#### Sub-Family CNODALONIDES.

#### 57. CHOLIPUS ATROVIRIDIS.

Oblong, narrow, black, very nitid, the elytra brilliant greenish black. Head very minutely punctate, the clypeal suture semi-circular, the clypeus truncate in front, and rounded on the angles with a short transverse depression in the middle near the suture, labrum transverse, thickened in front. Antennæ not quite reaching the base of the thorax, of a piceous colour, the last six joints broader and more compressed than the others. Thorax very minutely and thinly punctate, rather convex, nearly square, the anterior angles rounded, the sides slightly so, and margined,—narrowly in front and on the sides, and rather strongly on the base—with a broad transverse depression near the base, and parallel-sided. Elytra broader than the thorax nearly three times the length and

—long, 3 lines.

*Hab.*—Mossman River.

## Family CISTELI.

### Genus SYNTRACT

Head produced, narrowly necked, cly-  
ginate in the middle, labrum a little tr  
the clypeus. Eyes very large, not  
extending to the first third of the elytra,  
second short, the rest all of the same le  
which is elongate and thrice the length of  
maxilliary palpi are acutely cultriform.  
width of the head, a little longer than  
anterior angles, not broader behind than  
constriction at the base, and with the m  
reflexed and showing a minute tooth on e  
wider than the thorax, and widening some  
Legs slender, the tibiae not spurred.

### 58. SYNTRACTUS VARIA

Of elongate and rather flattened form  
irregular depressions between the eyes, th  
impressed and nearly straight, the labrum  
than the clypeus. Thorax entirely smoc  
the length of the th-

brown blotches, the legs also of all shades of red and brown, and the antennæ similarly variegated.

Length, 5 lines.

*Hab.*—Mossman River, Russell River, Cairns.

#### 59. *ATRACTUS FLAVIPES.*

Elongate, oval, brownish-black, opaque, the elytra nitid brassy-brown, the legs yellow. Head finely granulate, a slight semi-circular depression between the upper portion of the eyes, the clypeus short, the labrum nearly square, the palpi and antennæ reddish, getting darker towards the apex. Thorax dark brown, longer than wide, very slightly widening to the base,—both that and the apex truncate,—and finely granulate. Elytra wider than the thorax, narrowing towards the apex, punctate-striate, the interstices minutely rugose-punctate. The thighs are tumid and of a pale yellow, the rest of the legs are of a reddish yellow. One male specimen.

Length, 3 lines.

*Hab.*—Russell River.

#### 60. *ATRACTUS VITTIPENNIS.*

Elongate, narrow, acuminate behind, nitid throughout. Head black, finely punctate, clypeus broad, thick-edged and short, the clypeal suture nearly straight, the labrum large, widest at the apex, slightly emarginate, setigerous, and separated from the clypeus by a yellow membrane, the apex of the palpi and mandibles and the antennæ excepting the three basal joints, and the third from the apex which are yellowish, black. Thorax reddish-yellow, very smooth and nitid, much longer than broad, not wider behind than in front, parallel-sided, the angles rather rounded, and the apex and base truncate. Elytra of the same reddish-yellow nitid colour as the thorax, but the suture and lateral margins more or less broadly margined with black, the whole rather finely punctate-striate. The under surface is black, as well as the legs excepting the thighs

61. *HYBRENIA SUBVIT*

Oblong-oval, dark brown, sub-opaque, c minutely punctate, the clypeal suture clo and deeply impressed. Thorax finely and verse, broader at the base than in fro rounded; the posterior square, and the b Scutellum small and triangular. Elyt rather wider than the thorax, pointed at and rugosely punctate with eight striæ on e and the 5th and 8th interstices of a dark brown. Posterior tibiæ with a hooked spu

Length, 7 lines.

*Hab.*—Cairns.

62. *HYBRENIA LATICOLI*

Elongate-oval, moderately convex, blac thinly punctate and carinated between th large and close together. The antennæ are apex, the four apical joints reddish and put than the preceding. Thorax nearly twice as punctate, not broader at the base than in fro round, the posterior square and acute th-

convex interstices, each stria marked with large square punctures on the basal half. The legs are piceous, the tibiæ roughly punctate and setose, the sterna thinly punctate, the last abdominal segment large and deeply excavated. This last is no doubt a sexual character.

Length, 10 lines. One specimen, a male.

*Hab.*—Mossman River.

### 63. HYBRENIA ANGUSTATA.

Of narrower form than the last described species, black, subnitid, palpi and tarsi reddish. Head punctate, eyes contiguous, palpi very broadly triangular, the last joint of the antennae not larger than the preceding one. Thorax about as long as broad, densely punctate, rather convex, rounded at the anterior angles, rectangular behind, narrowly margined and nearly truncate at the base and with three shallow transverse depressions close to the base. Elytra a little wider than the thorax, pointed at the apex, elongate, with eight deep striæ on each elytron and a short sutured one (shorter than in *H. laticollis*), each stria filled with deep square punctures most deeply marked on the basal portion. The under surface is more densely punctate than in *H. laticollis*.

Length,  $7\frac{1}{2}$  lines.

*Hab.*—Cairns.

### 64. HYBRENIA SUBLÆVIS.

Oblong, oval, black, nitid. Head finely but not densely punctate, eyes close, not contiguous. Thorax about as broad as long, very thinly punctate, rounded at the anterior angles, square at the posterior, lightly transversely impressed near the base, and bisinuate at the base. Elytra broader than the thorax and four times the length, convex, irregularly and rugosely punctate, with eight lightly marked fine striæ on each elytron. The legs are densely punctate and shortly setose.

Length, 7 lines.

*Hab.*—Cairns.



width of the base of the thorax, ar  
middle and punctate striate. The u  
punctate, the thighs black.

Length, 5 lines.

*Hab.*—Mossman River.

This species ought perhaps to be pl

#### Family LAGRI

##### 66. LAGRIA RU

Oblong, red, nitid, elytra dark meta  
with a round depression between the e  
from the third joint. Thorax oblong,  
than the apex, roughly punctate wit  
impression near the apex, and another  
reddish, triangular. Elytra much broa  
squarely shouldered, amplified behind  
punctate, and clothed with a thin short  
under surface and the thighs are red  
tarsi brown.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Russell River.

##### 67. LAGRIA ALBOV

The legs, antennæ and all the

smooth and nitid. The antennæ are proportionally shorter than in the last described species, and the elytra are more amplified. It most resembles the *Lagria tomentosa* of Western Australia.

Length, 6 lines.

*Hab.*—Mossman River.

#### 68. LAGRIA PURPUREIPENNIS.

Like *L. albovillosa*, but smaller, less roughly punctate, and less thickly villose. The head and thorax are of a dark metallic green, the elytra of a ruddy purple, the under surface of a dark red and smooth.

Length, 4 lines.

*Hab.*—Mulgrave River.

### Family MORDELLIDÆ.

#### 69. MORDELLA PULVERULENTA.

Black, sub-opaque, subsericeous. Head clothed with a very short whitish pubescence. Thorax margined in front with white pubescence and with several irregular small spots on the middle and hinder parts. Elytra covered with many small white spots, some of them joining so as to form a small fascia near the apex. The pygidium is rather strongly pointed, the abdominal segments and sterna are slightly dusted with whitish pubescence. The anterior legs are piceous.

Length, 2 lines.

*Hab.*—Mossman River.

#### 70. MORDELLA NOTABILIS.

More elongate than the preceding, black, opaque, subsericeous. Head whitish-pubescent except on the vertex. Thorax margined with a white pubescence except on the middle of the apex, a little behind the anterior angles a transverse semi-circular line of the same colour, and in the same line near the centre small spots,

*Hab.*—Barron River.

71. MORDELLA O

Black, opaque, sericeous. Head in middle with whitish pubescence, the verse band of white nearer the ap longitudinal lines behind it, and a l border. Elytra each with an oval shorter oval spot near the suture abo one behind further from the suture. bluntly pointed, the flanks white spot Length, 6 lines.

*Hab.*—Mossman River.

72. MORDELLA U

This species is of a rather short transverse than usual and the pygidium pointed. The thorax has four narrow two of them lateral. The elytra have of the same kind, one at the base not r the middle complete from side to side incomplete. All the rest jet black.

Length, 1 line.

*Hab.*—Mossman River.

whitish spot behind the scutellum, a long hook-shaped spot on each side, four distinct round spots placed transversely about one-third from the apex and two similarly placed near the apex, white. Pygidium short and acutely pointed. This might be a *Tomaxia*.

Length,  $1\frac{1}{2}$  lines.

*Hab.*—Mossman River.

#### 74. MORDELLA NIGRANS.

Oval, black, subnitid, sericeous. Head and thorax scarcely pubescent. Elytra without distinct mark, but showing in some lights a very faint oblique longitudinal vitta. Under surface unspotted. Thorax scarcely transverse.

Length, 2 lines.

*Hab.*—Mossman River.

#### 75. MORDELLA OBSCURIPENNIS.

Of oblong form, sericeous, subnitid, reddish yellow with the elytra and abdominal segments brown. The antennæ are rather long and very slender and filiform, the head has a small smooth line on the vertex only visible under a lens, and the pygidium is long, slender and very acute.

Length,  $1\frac{1}{2}$  lines.

*Hab.*—Mossman River.

#### 76. MORDELLA FLAVICANS.

Of a more oval form than the preceding, entirely pale reddish-yellow, with the exception of the apex of the elytra which is brownish, sericeous, and sub-opaque, the antennæ are thicker and more dentate than in *M. obscuripennis*, the pygidium slight and acute.

Length, 1 line.

*Hab.*—Mossman River.

*Hab.*—Mossman River.

83. PELECOTOMOIDES SERRAT

This insect is almost identical with the p  
may possibly be only sexual. It is of a d  
densely sericeo-pubescent, the scutellum  
antennæ more strongly serrate, and the unde  
pubescent and of a reddish colour.

Length, 3 lines.

*Hab.*—Mossman River.

Family PEDILIDÆ.

84. EGESTRIA HIRTIPEN

Very dark brown, subnitid, very roughly  
with soft, erect, cinereous hairs. Head sq  
labrum very short, antennæ slender, the last  
others, maxillary palpi long, the joints tria  
angle pointing inwards, the last joint larges  
well-defined. Thorax transverse, rounded a  
truncate behind. Elytra broader than the t  
three times the length. Base of thighs, t  
yellow.

85. *EGESTRIA RUBICUNDA*.

Head, thorax and under surface black, legs and elytra piceous-red and nitid, the whole upper surface roughly punctate and clothed with soft cinereous hair. Head large, square, labrum very short and slightly emarginate, palpi thicker and shorter than in *E. hirtipennis*. Mandibles prominent, acute and unarmed. Antennæ rather long, slender, compressed, the last joint much the longest. Neck much constricted. Thorax elongate, of globular shape, not broader than the head. Elytra broader than the thorax, about three times the length and parallel-sided. Sterna and abdomen nitid and slightly pubescent.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Cairns.

## Family CANTHARIDÆ.

86. *PALESTRIDA CONCOLOR*.

Elongate, black with the back of the head, the thorax, and the elytra deep red, finely punctate and of a plush-like lustre, and the parts of the mouth and the prosternum yellow. Head small, eyes small and prominent, the space between the eyes depressed and of a blackish colour. Maxillary palpi rather long, the last joint slightly securiform. Antennæ rather broadly compressed, serrate, the joints slightly longer than broad, the second very small, the third and fourth joints equal, the last elongate-oval. Thorax about as long as broad, rounded on the sides, not broader behind than in front, with three broad longitudinal impressions, and raised interstices, these last showing a few small nodular-looking irregularities. Scutellum black, nearly square. Elytra broader than the thorax and five times the length, a little

#### 87. PALÆSTRIDA FLABELLII

Black, opaque, densely granulose-punctate the thorax, the base of the elytra and the plush-like lustre and texture. The head *concolor*, but the antennæ are more elongate third of the elytra, and from the outer apex third to the tenth, a branch extends of joint itself. The thorax also resembles the width is slightly more than the length. The elytra are broader than the thorax, and amplified behind with three rather in elytron. The bases of the thighs are reddish.

Length, 5 lines.

*Hab.*—Russell River.

#### 88. PALÆSTRIDA NIGRIPES

Entirely black, excepting the thorax, pro In sculpture it resembles exactly the two antennæ however are not branched as in *P.* more acutely serrated than in *P. concolor*. this species is not broader than long. The s

Length, 5 lines.

*Hab.*—Mossman River

The genus has never been properly characterized, but the original species *P. bicolor* seems to resemble them much.

#### 89. ZONITIS PALLIDA.

Entirely pale yellow above, black beneath. Head very minutely punctate, antennæ and palpi black, the latter with the last joint not widened at the apex. Thorax minutely punctate, longer than broad, slightly broader behind than in front. Elytra broader than the thorax, four times the length, and very densely and minutely transversely punctate, with three obsolete longitudinal lines on each elytron. Legs entirely black, excepting the claws of the tarsi, which are reddish.

Length, 5 lines.

*Hab.*—Barron River.

#### Family ŒDEMERIDÆ.

#### 90. ANANCA LATERALIS.

Pale yellow, covered with a dense short pubescence, densely and minutely punctate, and clouded a little with brown on the top of the head and on the thorax, and with an indistinctly defined vitta of the same colour on the elytra near each lateral margin. The thorax is longer than broad, and broader in front than behind, with two large shallow depressions on the anterior half. Elytra broader than the thorax at the base, and four times the length, with four obsolete longitudinal lines on each elytron. Under surface yellow excepting the four first abdominal segments which are black or dark brown.

Length, 5 lines.

*Hab.*—Mossman River.



smooth and nitid. Thorax smooth and nitid, broad, scarcely wider than the head, the equal width and the sides a little rounded in at the base not wider than the middle of narrowed to the apex, about four times the a deeply impressed stria on each side of the fine striæ densely and finely punctate on the stices smooth. The under surface is very punctured, the sterna reddish.

Length,  $4\frac{1}{2}$  lines.

*Hab.*—Cairns.

## 92. EPISCAPHULA GIGAS

Oblong-oval, black, subnitid. Head very circularly impressed between the antennæ the clypeus rounded and thickened at the apex rounded in front, the third joint of the antenna of the fourth. Thorax transverse, strongly emarginate in front, bisinuate behind, the scutellum and prominent, the posterior square, a large the base on each side of the median lobe punctures. The colour is black with a dark fascia occupying the sides and most of the transverse, rounded behind. Elytra very

punctate, the prosternum is flat, triangular and acutely pointed in front, the apex of the tibiæ and the tarsi beneath clothed with golden hair.

Length, 9 lines.

*Hab.*—Cairns.

### 93. EPISCAPHULA BIFASCIATA..

Oblong-oval, black, nitid. Head very finely punctate, clypeal suture not visible, the third joint of the antennæ longer than the fourth. Thorax less transverse than in the last species, anterior angles acutely produced, base slightly bisinuate, a small fovea on each side of the middle lobe, and a large red spot at the apex on each side of the median line. Elytra of the width of the base of the thorax and about three times the length, moderately convex and narrowing to the apex, and finely striate-punctate, with a yellow wavy fascia near the base and another near the apex, neither reaching the suture. Under surface black, legs pitchy red. Prosternum not pointed in front.

Length, 4 lines.

*Hab.*—Russell River.

### 94. EPISCAPHA FROGGATTI.

Oblong. Head black, minutely punctate without transverse impression, clypeus convex and rounded. Thorax much broader than long, the anterior angles slightly prominent, the base and sides thinly and coarsely punctate, of a red colour with a large square black spot in the middle of the base. Elytra about the width of the base of the thorax, a little narrowed towards the apex, finely striate-punctate, and of a red colour, with a square spot on the humeral angle, a larger one at the scutellum, a broad median fascia, a smaller one not reaching the suture between that and apex, and the apex black. Under side red, legs, meso- and metasternum black.

Length,  $3\frac{1}{2}$  lines.

*Hab.*—Cairns.

transverse and rounded behind.

Length, 2 lines.

*Hab.*—Barron River.

# NOTES ON THE BACTERIOLOGICAL EXAMINATION OF WATER FROM THE SYDNEY SUPPLY. No. IV.

BY DR. OSCAR KATZ.

Having been interrupted for about six weeks I was not able to take up again the bacteriological examination of Sydney water until the 29th of last April. From this date up to the 26th inst., however, I examined sixteen samples of this water, derived again in all the cases from the tap in the Laboratory of the Linnean Hall. The following table will best convey an idea of the results obtained so far as the quantity of bacterial colonies, referred to 1 ccm. of the water under consideration, is concerned.

Date.	Temp. of Water.	Number of colonies in 1 ccm.	Number of liquefying colonies in 1 ccm.
(1) Apr. 29, '87	66° F. = 18° <sup>8</sup> / <sub>9</sub> C.	140	35 = 25 p.c.
(2) May 2	66 <sup>2</sup> / <sub>3</sub> F. = 19 <sup>1</sup> / <sub>4</sub> C.	461	48 = 10 <sup>2</sup> / <sub>3</sub> p.c.
(3) „ 6	64 F. = 17 <sup>7</sup> / <sub>9</sub> C.	465	66 = 14 <sup>1</sup> / <sub>8</sub> p.c.
(4) „ 10	62 F. = 16 <sup>2</sup> / <sub>3</sub> C.	125	22 = 17 <sup>2</sup> / <sub>3</sub> p.c.
(5) „ 16	59 F. = 15 C.	41	5 = 12 <sup>1</sup> / <sub>5</sub> p.c.
(6) „ 19	58 <sup>1</sup> / <sub>2</sub> F. = 14 <sup>2</sup> / <sub>5</sub> C.	17	7 = 41 <sup>1</sup> / <sub>6</sub> p.c.
(7) „ 22	58 F. = 14 <sup>4</sup> / <sub>9</sub> C.	108	4 = 3 <sup>2</sup> / <sub>3</sub> p.c.
(8) „ 26	61 F. = 16 <sup>1</sup> / <sub>9</sub> C.	73	16 = 21 <sup>11</sup> / <sub>12</sub> p.c.
(9) „ 30	61 F. = 16 <sup>1</sup> / <sub>9</sub> C.	148	8 = 5 <sup>5</sup> / <sub>12</sub> p.c.
(10) June 3	61 <sup>7</sup> / <sub>10</sub> F. = 16 <sup>1</sup> / <sub>2</sub> C.	92	12 = 13 p.c.
(11) „ 7	56 <sup>3</sup> / <sub>10</sub> F. = 13 <sup>1</sup> / <sub>2</sub> C.	212	27 = 12 <sup>3</sup> / <sub>4</sub> p.c.
(12) „ 11	55 <sup>2</sup> / <sub>3</sub> F. = 13 C.	491	54 = 11 p.c.
(13) „ 14	54 <sup>4</sup> / <sub>3</sub> F. = 12 <sup>2</sup> / <sub>3</sub> C.	164	19 = 11 <sup>2</sup> / <sub>3</sub> p.c.
(14) „ 18	55 <sup>2</sup> / <sub>3</sub> F. = 13 C.	99	10 = 10 <sup>1</sup> / <sub>10</sub> p.c.
(15) „ 22	57 <sup>1</sup> / <sub>3</sub> F. = 14 C.	152	36 = 23 <sup>2</sup> / <sub>3</sub> p.c.
(16) „ 26	55 <sup>2</sup> / <sub>3</sub> F. = 13 C.	25	6 = 24 p.c.

taking into consideration the average number obtained each of the four times, we arrive at cubiccentim., out of which 67, or about 1/3, liquefied the gelatine. At the beginning I describe all kinds of bacteria met with; but by these became so large that from want of time I had to give the idea up. In order to have an investigation of every kind of bacterium found has to deal with its principal biological properties mentioned previously, it has to be ascertained which cultivated are so-called "water-bacteria," and be looked upon as merely accidental. But unable to do this I trust that the results of my form offered, will not be quite devoid of interest. Of typhoid fever I have not yet come across although now and then bacteria came under consideration unlike it in several points. By that I do not think the true microbe of typhoid fever might be present in this water; it must be borne in mind that the chances to obtain it from this source will be small of the fact that comparatively only minute quantities, 1 ccm., can be taken for each individual tested. As there is a strong suspicion of its being grossly contaminated with the germs of typhoid fever, the chances to find these out of the water, naturally increase, and the carrying out of bacteriological examination

# PRELIMINARY REMARKS ON PHOSPHORESCENT BACTERIA FROM SEA-WATER.

BY DR. OSCAR KATZ.

Influenced by a memoir recently published by Dr. Fischer, on a light-producing bacterium found in sea-water near the Danish Island of St. Croix, in the West Indies (1), and also by his statements on another kind of fission-fungus derived from dead marine fish out of the Baltic Sea and the Berlin Aquarium (2), I commenced to look for phosphorescent schizomycetes which might occur in the sea-water of our vicinity (Sydney). My endeavours have hitherto proved so far successful that up to now I have been able to obtain three kinds of this very interesting group of micro-organisms, which are capable of cultivation in various nutritive substances, which can be transferred to marine animals (fish, crustaceans), so as to show what often happens spontaneously (so-called self-phosphorescence of fishes, &c.), and which on being added to common sea-water are able to render this luminous in such a way that it produces an effect similar to certain kinds of what is known under the general name of phosphorescence of sea-water.

---

(1) "Bacteriologische Untersuchungen auf einer Reise nach Westindien" von Dr. Fischer, Marinestabsarzt. II. "Ueber einen lichtentwickelnden in Meerwasser gefundenen Spaltpilz, *Zeitschrift f. Hygiene*, Bd. II., Heft 1, Leipzig, 1887, pp. 54-92.

(2) Addendum to the above publication, pp. 92-95. A paper by Dr. O. Hermes on, as I must believe, the same bacterial species, which he has named *Bacterium phosphorescens*, I have not yet seen. A short note of it is given in "Nature," February 17, 1887, p. 377.

as in *Bacillus smaragdino-phosphor*  
tiation between a well-coloured pe  
part in a very characteristic manne

*Bacillus cyaneo-phosphorescens* &  
nutritive gelatine which graduall  
this regard it differs widely from  
mentioned, cause no liquefaction o  
better on nutrient agar-agar, wher  
time, it forms a substantial, greyish

The *optimum* of growth as wel  
microbe is between 20° C. and 30° C.  
between 13° and 15° C., however, de  
able to its propagation or deleteriou  
although higher temperatures as abo  
phosphorescence. The colour of the  
at least in sufficiently dark surround  
tint, and seems to stand, as regards  
*Bacillus* No. I. and No. II.

Comparing Dr. Fischer's description  
*phosphorescens* with what I have a  
bacillus from Little Bay, I am almo  
two organisms as identical. Howe  
definite opinion until I have made a  
observations.

---

more elaborate paper on this subject I am going to prepare for a future Meeting—I wish to call attention to this interesting subject, as the question of the cause of certain kinds of phosphorescence of sea-water, for the explanation of which nothing certain as yet has been advanced, will now, it is to be hoped, soon be solved. Pflüger (quoted from Dr. Fischer's Treatise, l.c., p. 55), already suggested, a number of years ago, that micro-organisms of the group *Bacteria* participate in the production of phosphorescence of sea-water, and the experiments recently made by Fischer with pure cultures of luminous schizomycetes on ordinary sea-water, convinced him of the striking resemblance which an artificially produced luminosity of sea-water bears to that magnificent phenomenon described by English writers as "milky sea." The direct proof, he says, that such an appearance is brought about by bacteria of the above nature, is still a desideratum, but by means of continued researches it is sure to succeed. For my part I have not the least doubt that this will be the case, to judge from what I have read and heard about "milky seas"—I have not yet been fortunate enough to come across such a phenomenon—and from experiments made by me on sea-water with pure cultures of the three species of bacteria mentioned. A systematic or occasional search for such like sea-water bacteria at different places of the globe, may no doubt add to the number of kinds already found, although I believe the number of them will not become very large. Those forms which are now known belong to the aërobic class of micro-organisms, that is to say, they neither grow nor emit light without the presence of air (oxygen). Whether or not phosphorescent bacteria of the anaërobic class, propagating only with the exclusion of oxygen, may be detected in sea-water, either directly or indirectly (in marine animals), and whether or not such micro-organisms may play a part in certain kinds of phosphorescence of sea-water, all this is still an open question. There is on record the statement by two investigators, Bancel and Husson, (1)

---

(1) Sur la phosphorescence de la viande de homard. *Comptes rendus*, 1879, Vol. 88, pp. 191-192.



by parasitic micro-organisms. It is  
anaërobie forms may be found to be the  
number of luminous marine animals  
only mediately to the phosphorescence

---

(1) Quoted from Fischer

## NOTES ON SOME AUSTRALIAN POLYZOA.

By T. WHITELEGGE.

(Notes from the Australian Museum).

In the British Museum Catalogue of Marine Polyzoa, Part II. (1854), the late Mr. Busk, F.R.S., described two species of Polyzoa from the Philippine Islands, which he referred to the genus *Lunulites*, at the same time remarking that they were "curious forms and would appear to constitute a peculiar group." In the years 1879, '80, and '81 the Rev. J. E. Tenison-Woods, Mr. W. A. Haswell, and the Rev. T. Hincks published papers describing several species which are closely allied to those described by Mr. Busk. The various species have been assigned to four or five genera. I intend in this paper to show that the undermentioned species form a very distinct group having little in common with those with which they have usually been associated except habit or form :—

*Lunulites Philippinensis*, Busk.

„ *cancellata*, Busk.

*Cupularia crassa*, Tenison-Woods.

*Conescharellina depressa*, Haswell.

*Lunulites angulopora*, Tenison-Woods.

*Conescharellina conica*, Haswell.

*Lunulites incisa*, Hincks.

*Eschara umbonata*, Haswell.

*Flabellopora elegans* ? d'Orb.

Mr. A. W. Waters in a paper on some fossil Polyzoa from New Zealand (Quart. Journ. Geol. Soc. Feb. 1887, p. 71), states that he had received recent specimens of the last-named species from N. S. Wales, "which is either *Lunulites cancellata*, Busk, or very closely allied to it."

the lower lip.

Mr. Woods figures the oral aperture omits to mention details in his description (J. Geol. Soc. 1882), gives figures of *L.* the oral aperture is shown, but these and in his description he simply re-orifice with a proximal sinus. It is I did at the time recognise the true significance of the orifice." Another prominent feature of the oral aperture, well-described by Mr. Woods, and well-described by Mr. H. lunar slit with the concavity directed caudad, has been overlooked, and its true importance has been overlooked, and its true importance has been overlooked.

The facts as to the actual structure mentioned have been derived from an attentive examination of the Australian Museum, Macleay Museum, and some lent to me

The structural features presented by the group are of such an exceptional character that to remove them altogether from the families most of the species have been placed in. They possess characters which are either unknown to other species of polyzoa; and possibly were not investigated they may form the basis of a new genus.

of intercalary growth, as far as I have been able to ascertain, are recorded by Mr. Hincks, but in these cases it is confined to the ovicelligerous cells of *Schizoporella hyalina*, and *S. linearis*.

The formation of new zoecia does not appear to be confined to any particular part, but may take place at any point between the centre and the margin; when near the latter the zoecium is formed in the space intervening between two, and when nearest to the former in the intervening space bounded by four zoecia. The direction of the zoecia is also apparently reversed, from the fact that the free distal edge of the operculum is nearest to and directed towards the apex in those of a conical form, and to the apparent base in those which are flattened; while the hinged end or proximal is nearest to the outer margin of the zoarium.

The manner in which the peristomial orifice is formed appears to be just the opposite to what obtains in other peristomiate Polyzoa, and there is a special feature of an important character which, if not new to the class is exceedingly rare, and so far I have searched in vain for the record of a similar structural element.

The first indication of the formation of a new zoecium appears on the upper surface of the zoarium as an elevated or depressed round spot bordered on one side by a thin layer of epitheca. At this point the "semilunar slit with the concavity directed outwards" is formed, and by the gradual extension of this slit to a circular form a piece of the calcareous lamina is cut out, the resulting opening being that of the peristome, and at a short distance below the true oral aperture is seen to be also in a fully formed condition. It is the rule to speak of the opercular-bearing aperture as the primary, and of the peristomial as the secondary orifice; but in this case it appears doubtful which ought to rank as primary or secondary.

In a median line above the mouth close to or upon the margin of the peristome there is a circular or subcircular pore usually covered by a membrane. It is this pore, when in an imperfect or broken state, that has been mistaken for the proximal sinus in the lower lip of the oral aperture; but the true oral sinus is much wider, and at the opposite end of the mouth to that of the pore.

... to each other, and various genera to which they have belong either to the genus *Lunuli* genus *Conescharella* as at present the same may also be said of *Flabell* referring to *Lunulites incisa* H. *Schizoporellidæ*." Nevertheless to ultimately prove to be related, at present genus for their reception.

#### BIPORA, n.

Zoarium uni-or bilaminate, conical ellate expansions; growth intercalary side by side, with their bases resting forming alternating rows directed to zoarium; oral aperture with a well-marked A special pore above the mouth; per the gradual extension of a narrow slit of the calcareous lamina. Oœcia external.

#### (1.) BIPORA CANCELLATA

*Lunulites cancellata*, Busk, Brit. Mus. II, p. 101, pl. CXIII, figs. 4-5-6-7.

Zoarium conical, plane or slightly apertures rounded above with a distinct

I have examined several fossil examples of this species which appear to agree with Busk's description and figures, and which may be identical with the form figured as *L. cancellata*, Busk, by Mr. Waters in his paper on Fossil Bryozoa from Bairnsdale, but, both in this species and in the next, the identity can only be definitely settled by comparison with the types.

*Loc.*—(living) Philippine Islands; (fossil) Muddy Creek, Victoria.

(2.) *B. PHILIPPINENSIS*, Busk.

*Lunulites Philippinensis*, Busk, *op. cit.* Part II, p. 101, pl. CXIII, figs. 1-2-3.

Zoarium depressed, conical, plane or convex beneath, usually about  $\frac{1}{2}$  of an inch in diameter; zoecial orifice elongate, rounded above, and with a wide rounded sinus below; operculum oval; peristomial orifice ovate, the margin produced above at the sides then suddenly depressed below, with a subcircular pore on the upper border; an avicularium with a subcircular mandible on each side and sometimes one in front below the mouth, a number of similar avicularia on the under surface of the zoarium, some on rounded elevations and others in circular depressions. Oœcia external, globose, smooth, with a faint fimbriated stigma in front.

*Loc.*—Port Jackson.

This species is frequently to be met with in some parts of Port Jackson, and I have examined a fair number of specimens. The surface of the zoarium is covered with a thin yellowish epitheca; and the semilunar slits which indicate the growth of new zoecia are to be seen in all stages of development, especially in the young. It is by a careful examination of this species that I have been enabled to work out the structure of the others. The zoarium, when seen in longitudinal section shows the concave side as having a cancellated layer of varying thickness, from which the zoecia take their origin; each zoecium is narrowed at the base and very slightly bent inwards; its direction from this point is outwards, with a gentle curve upwards, at nearly right angles to the cancellate layer.

it may possibly be the retreat of a protuberance  
in no case have I seen anything at the base  
which would indicate the presence of an external  
cancellate structure, which exists more or less  
and originates by the lower portion of the  
zoarium partitioned off as the zoarium increases

In some of the specimens lent by me they are  
fairly abundant, but, except the zoarium  
or set on its edge, the orifice cannot be seen  
will be evident that they are in the usual position  
and nearest to the primary part of the zoarium

(3.) B. DEPRESSA, F.

*Conescharella depressa*, Hasw. Proc.  
Part I, Vol. V, p. 41, pl. III, fig. 4.

Zoarium biconvex, slightly flattened  
elongate, rounded above, with a small  
diameter of the mouth; or ovate with a  
each side near the base. Operculum of  
thickened border and two circular  
peristome much elevated above, and  
mouth, then suddenly depressed; an  
triangular mandible situated on a low  
mouth.

“Under surface of zoarium perforated

I have only seen some 5 or 6 specimens of this species, all of which are immature, and probably when obtained in the adult state the zoarium will be found to be concave beneath. I have seen one specimen in which the base is concave, but it is too imperfect to be certain as to its identity. The figure given by Mr. Haswell is upside down, but the outlines of the peristomial orifices are correct. The outer row of zoecia are very prominent, and without avicularia.

(4.) *B. CRASSA*, Tenison-Woods.

*Lunulites (Cupularia) crassa*, Ten.-Woods, Trans. Phil. Soc. Adelaide, 1879-80, p. 5, pl. I, figs. 1a, 1b, 1c.

I have examined the type specimens in the Macleay Museum, which resemble the last species in the peristomial characters, the margin being produced, and very much thickened at the sides, hiding to a great extent the oral aperture, which lies in a depression below.

The avicularia however have a subcircular mandible, and the pore over the mouth is large. I have no doubt of its being a good species. Mr. Waters when speaking of the plates which accompany Mr. Woods's paper mentions the fact that the whole of the species figured are the wrong side up, which is certainly true of all the species except two; but even these were intended to represent the same aspect as the others. The figure of *B. crassa* is after all the right side up, and gives an accurate view of the oral aperture with the special pore above. It is also probably the first published figure which exhibits the form of the true opercular-bearing aperture.

I have no doubt Mr. Woods saw the important structural difference between this species and those belonging to the *Selenariadæ*.

*Loc.*—Off Cape Three Points, and Port Stephens (70 to 80 fathoms).

(5.) *B. ANGULOPORA*, Tenison-Woods.

*Lunulites angulopora*, Ten.-Woods, *op. cit.*, p. 7, pl. I, fig. 3a-3c; *Conescharellina conica*, Hasw. Proc. Linn. Soc. N.S.W.,



cells near the base ; oral aperture sinus below which is about  $\frac{1}{3}$  the culum ovate, constricted (?) near on the upper half ; peristome el below the mouth, orifice ovate with avicularia forming elevated rows mandibles triangular with an acute when perfect covered by a calcareous avicularia some on elevations and on the summit of the zoarium there avicularia bearing cells with long ac

*Loc.*—Holborn Island, Port Step

The question of priority in this sfavour. His paper was read in probably be published early in 1880 January 1880, and would probably while that of Mr. Hincks did not ap

The figures of the zoœcia given also of Mr. Hincks, are, I think, u shading and the very narrow sinus s like the pore above the mouth than t is in perfect specimens about  $\frac{1}{3}$  the zoœcial apertures in Mr. Woods's fig is the right side up, and shows a cor with the concavity directed outwards

The slit which indicates the formation of a new cell invariably has an avicularium below, with the mandible pointing downward at first, but as growth goes on this is usually forced to one side of the mouth, though occasionally it remains in front.

(6.) *B. UMBONATA*, Haswell.

*Eschara umbonata*, Haswell, *op. cit.*, p. 41, pl. II, figs. 5-6.

Zoarium free, bilaminate, flat, simple or forming trilobate expansions, "surface ornamented with numerous rounded knobs of various sizes," zoecia immersed, directed towards (what appears to be the base) the primary part of the zoarium. Oral aperture rounded above, and a wide sinus below; peristomial orifice nearly round, margin slightly elevated, with a subcircular pore on the upper border; an avicularium on each side of the mouth, frequently a third one in front, mandible triangular generally pointing upwards.

*Loc.*—Holborn Island, (20 fathoms).

There are three specimens in the collection of the Australian Museum, one a flat piece  $\frac{1}{4}$  of an inch by  $\frac{1}{8}$  of an inch: the other two have each three lobes; the central one in the larger specimen is  $\frac{5}{16}$  from base to summit, and the lateral lobes  $\frac{1}{8}$  of an inch in length, and nearly as wide; all the lobes taper a little outwards. The "semilunar slit" is not seen in any of the specimens, but the peristomial opening is, I believe, formed in the same manner as in the others; several of the zoecial openings are closed by a calcareous plate, and have the appearance of young zoecia; the plate is seen to be thinner at the margin; probably the slit-like opening is not formed.

Mr. Haswell's description of the mouth of this species clearly shows that it was the anterior pore which he mentions as the sinus in the lower lip. He says "mouth varying in form, the lower lip sometimes straight, sometimes with a small sinus, sometimes with a rounded central lobe." This exactly describes the appearance of the anterior oral pore in various stages of perfection. The peristomial orifice with the pore broken down closely resembles the

...formed sinus in the lower lip  
to that of the pore. It is from the  
mouth that the name *Bipora* is gi

(7.) BIPORA (?)

*Flabellopora elegans*, d'Orb., W  
1887, p. 71.

Zoarium free, bilaminate, flabell  
inch wide by  $\frac{3}{8}$  of an inch deep, wi  
centre on the concave side; zoecia  
side, their bases separated by a t.  
alternate rows, and directed toward  
aperture rounded above, with a rathe  
slightly higher above the mouth tha  
with a median pore above, a depress  
usually below the mouth, occasionall  
subcircular pointing upwards and ou  
avicularian cells on the nodular proje  
*angulopora*.

*Loc.*—Port Jackson.

If this species should prove to be  
from the fossil form described by d'Or  
it can remain as *B. elegans*, Waters.  
Frauç. Bryoz. Tom. V. pl. 661) certai  
The same may be said of *B. umbo*  
d'Orbigny.

viewed from above greatly resemble *B. angulopora*, and if a little less compressed might be mistaken for that species at first sight. The avicularian cells are present in both specimens on the nodular projection, and the simular slits on various parts of the zoarium. The slits can be seen even in very old specimens scattered about on the surface. It is not difficult to trace the stages by which the conical form might be changed into the flabellate, and afterwards into the lobate form, and which has probably taken place. If we imagine the internal cancellated layer to become less developed, accompanied by a gradual compression, and the addition of a few more rows of zoecia towards the outer margin, we can easily see that we should have a form like *B. elegans*, which is in reality only a flattened cone with the base widely extended, and in *B. umbonata* the flabellate form is changed into a lobate one by the non-development of a portion of the colony. So that the broad non-divided end of the last-named species and the nodular portion of the former correspond with the apex of the cone.

---

*Postscript.*—Since the foregoing was written I have been fortunate in obtaining some living examples of *Bipora Philippinensis*, Busk, which I have had under observation for three days. Nearly every specimen possesses a pair of tubular filaments inserted on each side of the zoarium, about mid-way between the margin and the summit on the upper surface; each tube is about  $\frac{1}{2}$  an inch long, and in some cases attached to the tubes of an annelid, and in others to fragments of shell. Some of the specimens have begun to form new attachment tubes which are about three times the height of the oecia. Each tube is seen to be lined with a layer of sarcode similar to that seen in the growing offshoots in *Victorella pavida*, S. Kent, consisting of granular and fisiform bodies which form a kind of net-work. The tube appears to grow out of an avicularium either at the side or in front of the zoecial orifice. After repeatedly counting the number of tentacles, I find that they vary from 13 to 15. The pore above the mouth is covered by a membrane, and the marginal row of zoecia have the peristome produced below into an acute triangular hyaline point.

No. 6.—LIST OF PLANTS FLOWERING  
 SYDNEY DURING THE MONTH OF  
 THOSE ENUMERATED IN FORMER

Rutaceæ—	]
<i>Eriostemon hispidulus</i>	
Euphorbiaceæ—	
<i>Monotaxis linifolia</i>	C
Dilleniaceæ—	
<i>Hibbertia saligna</i>	X
Myrtaceæ—	
<i>Tristania nereifolia</i>	Li
<i>Angophora lanceolata</i>	
<i>Myrtus tenuifolia</i>	U <sub>1</sub>
<i>Leptospermum arachnoidesum</i>	
<i>Eucalyptus obtusifolia</i>	Sci
Proteaceæ—	
<i>Persoonia hirsuta</i>	Li
<i>Grevillea sphacelata</i>	
<i>Lomatia silaifolia</i>	
Compositæ—	Or
<i>Olearia dentata</i>	
<i>Cotula australis</i>	
Stylidææ—	Pl
<i>Stylidium graminifolium</i>	

NOTES ON AUSTRALIAN LAND-PLANARIANS, WITH  
DESCRIPTIONS OF SOME NEW SPECIES. PART I.

BY J. J. FLETCHER AND A. G. HAMILTON.

(Plate v).

This paper is a preliminary one inasmuch as it does not deal with the anatomical characters of Australian Land-Planarians. This is intentionally the case because to have rendered this part of the subject at all complete would necessarily have delayed its publication, whereas we are anxious to profit by the eminently favourable season for acquiring additional material. Owing to the prolonged damp weather land-planarians are more than usually abundant this year, and by calling the attention of members of this Society living in country districts to this fact, and offering a *résumé* of what is known of this much-neglected group, we hope that some of the more local species which are in danger of extermination, may be obtained for examination and description.

During the voyage of H.M.S. 'Beagle' Mr. Darwin collected Land-Planarians at the various places visited, and among them a species from Tasmania. A general account of them is given in "The Voyage of a Naturalist" (p. 26), and they were subsequently described in the "Annals and Mag. of Nat. Hist." (Vol. XIV. 1884, p. 244), the Tasmanian species under the name *Planaria Tasmaniana*.

Mr. Moseley likewise during the voyage of H.M.S. 'Challenger' assiduously collected Land-planarians as opportunity offered, three species being obtained from the neighbourhood of Parramatta and Camden, N.S.W. These were afterwards described (Quart. Jour. Micro. Sc. 1877, p. 285), a new genus *Cænoplana* being instituted for them.

at Springwood (1,200 ft.) H.  
(3,400), from near Capertee (3,400)  
Valley, from various localities in  
of us is resident, and from Bu.  
have been able to go further afield  
permitted him to do, yet relative  
may reasonably be supposed to inhabit  
chiefly the coastal districts, we have  
gleaned in a few places. Never  
sufficient material to enable us  
species, to announce the occurrence  
by the possession of two eyes, hitherto  
and to adduce reasons for their  
Moseley in *Geoplana*, F. Müll.  
Macleay has kindly allowed us to  
Museum; Mr. Olliff has given us  
the Hunter River district, and Mr.  
species from Victoria, so that  
particulars about geographical distribution  
thank Mr. Masters for a quantity  
of the Sydney nurseries.

Of the sixteen species of which  
examples, not one of them can be  
*Cænoplana* of Moseley. Six of  
the possession of two instead of  
logical examination to which we have

Eight of these are new, but the remaining two species agree so well as regards their external characters with the descriptions of *Cænoplana cærulea* and *C. subviridis* of Moseley, except in the matter of eyes on the anterior extremity, that we cannot but think that they are identical with them, but that Mr. Moseley, possibly from an insufficient or indifferent supply of material, or from the study only of spirit specimens overlooked the presence of eyes on the anterior extremity. That Mr. Moseley had too much to occupy his attention during his short stay here to permit of studying the Australian planarians in the living condition is very probable from the fact that, in the same volume of the Journal which contains the paper already referred to, there is an earlier one, "On the Colouring Matters of Various Animals, and especially of Deep-Sea Forms dredged by H.M.S. Challenger" (*op. cit.* p. 11) in which the following passage occurs: "At Parramatta, near Sydney, N.S.W., two large species of *Rhynchodemus* are tolerably common, one of which is of a uniform Prussian blue colour, whilst the other is a uniform red." From this passage it would appear that when this earlier paper was written Mr. Moseley had investigated only the colouring matters of the Australian planarians, otherwise he would not, even provisionally, have referred these two many-eyed species to a genus characterised by the possession of two eyes; the descriptions of Australian planarians were thus probably drawn up at a later period, and therefore from spirit specimens. This being so, we can from our own experience with spirit specimens readily understand how the oversight might have occurred; as though we have spirit specimens of some species in which the eyes on the anterior extremity are perfectly visible with a lens, we have others in which without having seen living or better preserved specimens should be very sorry to be obliged to give a decision on this point.

In his description of the Tasmanian form Mr. Darwin says: "ocelli scattered round the entire margin of the foot, but most frequent at the anterior extremity." In his description of *Cænoplana* Mr. Moseley says: "eyes absent from the front of the anterior extremity, but present in lateral elongate crowded patches



...s. Numerous eye-spots :  
in a single row composed of twelve  
margin of the head and in an elongate  
head made up of two or three rows pl  
containing about forty eye-spots. Eye  
more sparsely on the lateral margins c  
length posteriorly to this patch." No  
numerous eyes this is substantially t  
with. Thus in a young specimen of one  
shortly after its emergence from the coc  
about 4 mm. long and 1 mm. broad, it  
eyes, of which there were about 40 in ea  
two, three or even four deep, and these  
by a single closely set row of about 16  
very tip of the anterior extremity ; post  
were about 20 on each side scattered at  
intervals (1). The total number of eye  
of eyes and of rows of them in the crow  
the size of the animal, and appear not to  
They are very numerous in the adult  
sometimes show six or seven or e  
spots in the crowded patches exten

---

(1) The actual number of eyes that ...

dorsal surface and lying dorsad of the outermost dorsal stripe. The eyes are readily discernible with a lens both in living and usually in well-preserved specimens of most of the species; in the blue-tipped variety of *G. cærulea*, and in *G. rubicunda*, however, they are more difficult to make out even in living specimens, though under a low objective they can be seen to have the usual arrangement. In *G. rubicunda* the eyes are more inconspicuous, smaller, and in the crowded patches in the specimen examined only about two rows deep. In the other species it is the dark colour of the back-ground which makes it difficult to see them.

If our supposition be correct that Professor Moseley from the examination of indifferent spirit material overlooked the presence of eyes on the anterior extremity of the Australian land-planarians examined by him, it seems unnecessary, in the present state of our knowledge, to separate these forms as a distinct genus *Cænoplana* on purely anatomical grounds (the arrangement of the muscles, and of the lateral organs). No doubt eventually it will be found necessary to take anatomical characters into account in defining the genera, and in establishing his two new genera *Cænoplana* and *Dolichoplana* Mr. Moseley did so. But we cannot find such definitions of *Geoplana* and *Rhynchodemus*. Moreover, the genus *Geoplana* already comprises 28 species (26 of which are enumerated in Moseley's Catalogue, with *G. Whartoni*, Gulliver, from the Island of Rodriguez, and *G. Moseleyi*, Hutton, from N. Zealand, since described) whereas the anatomy of only about two species is satisfactorily known (1). Under these circumstances therefore, and as all the many-eyed Australian species we have met with

---

(1) Speaking of the whole family Mr. Moseley says: "Of the *Geoplanidæ* the complete anatomy including that of the generative organs is known as yet only in the case of certain species of *Rhynchodemus* and *Bipalium* from Ceylon, and in *Geoplana Traversii* of New Zealand. The arrangement of the muscles and of the lateral organs (nervous systems or primitive vascular systems?) of the *Rhynchodemus* of the Cape, of a *Geoplana* of Brazil, of the Australian *Cænoplanas*, and Manilla *Dolichoplanas* has been determined, and it appears that the *Geoplanidæ* form a very natural family" (l.c. p. 291).

the Dromenaceæ. They appear to rest during the night." (1) Omitting the remarks these remarks are applicable to Australia have little to add to them. Mr. Mosel in Brazil, found planarians under fallen leaves and the sheathing leaves of the banana plant on palm stems in the daytime in very places where there was very little light; also on Agaves; and in Australia "they were found up in cavities under fallen logs, and under lanterns, crawling on the trunks of Eucalyptus wounds from which sap was exuding. They have been obtained by turning over logs, stones, and stones, when the planarians were found or adhering to the undersurface of the leaves or cracks and crevices even of charred logs. Towards the close of a wet day we found *G. cœrulea* crawling across the road. We found a specimen crawling on a dead log several times crawling over stones in the shade. In one case a specimen of *G. viridis* on a black log in sunshine; but we have not yet met with

In dry weather they probably burrow. We frequently found them in the soil. and a

glasses pressed down on earth in flower-pots, from which at night-time they invariably escaped without difficulty by burrowing.

The situations in which we have found them are various. On the Blue Mts., at Mt. Wilson (3,400 ft. above the sea), as well as near Guntawang, we have found them on the tops of ridges, on the slopes leading down to gullies, and in the gullies; on the banks of the Cudgegong River, and on the edges of swamps; frequently on the edges of clearings, on lightly timbered land, or in scrub land; but we do not know yet whether they live in the thick brushes, where if they do occur the sheathing fronds of ferns like *Platycerium*, or *Asplenium nidus* might furnish them with resting places. On the summits and slopes of the ridges and in the more open gullies where there is no vegetation of this sort but only the ordinary forest trees and scrub, they seem to adopt themselves to circumstances and manage very well without it.

Some of the species are pretty widely distributed, one extending to Queensland and another to Victoria; others as far as we know at present are very local. We have not had them from further inland than the Mudgee district on the other side of the Dividing Range, and we should be glad to know if they are to be found in the interior. From the County of Cumberland we have obtained specimens belonging to six species, all occurring elsewhere; from Springwood six species, of which one *G. rubicunda* has not been found by us elsewhere, but there are some examples of it in the material given us by Mr. Masters; from Hartley Vale six species, three of which are local; from Mt. Wilson six species of which one has been found nowhere else; and in the Mudgee district seven species of which three are local. Individually, except in favoured localities or under very favourable circumstances, planarians cannot be said to be very abundant, and it usually involves a considerable expenditure of time and trouble to obtain many specimens. Nevertheless, in the Mudgee district one of us believes that he could sometimes have obtained a hundred specimens without much trouble. Elsewhere however, we have had to be content with a dozen specimens for a day's work. But, as a

...moving round the palate and jejunum  
alimentary canal of a planarian which  
Müller also describes a species, *G. subte*  
company with a species of earthworm and  
earthworms are devoured, or rather sucked.  
That this was the mode of nourishment, was  
coloured by the colour of the contents of the intestine. But  
*Geoplanæ* which were holding a young  
protruded probosces, and whose intestines  
filled with fresh blood " (l.c. p. 6).

It is quite possible that the nature of the food varies  
in different species. If ours are carnivorous, we should  
understand what animals furnish them with food. If  
traces of earthworms or snails are seen within the body,  
though both may sometimes be found. planarians are certainly to be found under  
rotten, and in gardens and bush-houses where  
of rotten wood in the immediate vicinity  
to wonder whether, like earthworms, they  
derive nutriment from the soil.

But whether Darwin's opinion be correct or not, it is a  
better plan than his of keeping these creatures in a  
namely, of putting them in a tin or jar with soil  
and not unnecessarily exposing them to the light.  
time we have several specimens which have been kept

Those belonging to the genus *Rhynchodemus* seem to be much more delicate than the species of *Geoplana*; it is much more difficult to keep them alive for any length of time, and even when handled in the most careful manner, using a feather in moving them, they frequently break up into pieces in the most provoking manner when touched, or on exposure to the light during examination, while in dealing with the species of *Geoplana* we have had little or no trouble. Though they evidently dislike exposure to strong light, yet sometimes when the tin in which we keep them has been incautiously left uncovered for a short time they have braved the consequences in their efforts to escape. Some have got right away, while others were found by following up their slimy tracks, a few feet off, dried up on the table partly through the dust on it.

We know nothing definite concerning the enemies whose attacks they have to withstand. In turning over logs in search of planarians, one cannot help noticing the numbers of centipedes, scorpions, spiders, ants, and predaceous beetles which are exposed to view, and of suspecting some or all of them of being at enmity with the planarians.

Nearly all our species of *Geoplana*, like many found elsewhere, are conspicuously marked, and some of them brightly and variously coloured. Thus one is blue with a white stripe, two are red, one is grass-green with reddish stripes, another bright yellow with dark stripes, and so on. This is the more remarkable in that they are essentially nocturnal animals. Darwin himself points out that in the case of hermaphrodite creatures such as planarians "the colours do not serve as a sexual attraction, and have not been acquired through sexual selection" (*Descent of Man*, p. 260). Nor, avoiding the light as they habitually do, is it clear how their colours can be of use to them as a protection either by assimilating them to the colour of their surroundings, or as in the case of gaudy caterpillars by serving as a warning to their enemies that they are distasteful, or that they are provided with defensive structures in the shape of urticating organs (rod cells). On the

surface is distinctly arched or concave ; edges of the concave portion sensory, as frequently put forth, which touch the surface is crawling, just as is the case with the cheese-cutter-shaped extremity of *Bipalium*, the arching disappears, but the margins show a slight but noticeable ridge on each side. We hope later to investigate these structures.

Mr. Moseley was the first to describe the capsules of land-planarians, which were specimens brought to him by Mr. Travassos during the first week of July. His descriptions were perfectly spherical and varied in diameter from 1 to 2 mm., being as large as an ordinary pea. They were resistant, and of very dark brown or almost black color. The walls are composed of a thin continuous chitinous substance, which is highly elastic and scrolls when torn into fragments. The interior has no definite structure, but only fine granules are visible through a homogeneous base, partly gelatinous. The egg capsules were found to contain several embryos which lay quite free within the cavities of the capsules, packed together, being curved up to accommodate the confinement" (l.c. p. 279).

the Mudgee district on one occasion found a cluster of ten under a piece of wood, and on another occasion twenty-four cocoons from all but one of which however the young had hatched. These were the capsules of *G. quinquelineata*, the only species of which we have yet seen the newly-hatched young, but we have a few cocoons of other species which are still under observation. The cocoons met with vary slightly in size and shape; usually they are spherical, and 3 or 4 mm. in diameter; others have one axis longer than the other, about 5 × 3 mm. When freshly deposited they are yellow or orange-coloured, but in the course of a day or two the colour changes to a dark reddish-brown or even black. The number of young which come out of a cocoon is about three or four. In two instances the young hatched out in five weeks or a day or two longer, after the deposition of the cocoons. The latter usually rupture and when empty collapse, but in one case the young emerged from a small circular hole without the cocoon rupturing or collapsing. Sometimes the cocoon ruptures a few days before the animals leave it; at other times they come out very soon after. The newly-hatched young of *G. quinquelineata*, vary slightly in size, from 2.5 to 4 mm. long and 1.5 mm. wide, or even longer when fully extended; they are striped just as are the adults, except that the outermost stripe on each side is either very faint, or altogether absent; both stripes and ground-colour are in some cases brighter and pinker than is usually the case in adults, but the colours are extremely variable in this species, though it is perfectly well characterized, by its five dorsal, linear stripes. As yet we have not met with the young ones of any other species.

In addition to the sexual mode of reproduction, planarians frequently divide spontaneously by transverse fission into portions which are capable of acquiring the characters of complete animals. Mr. Darwin gives an interesting account of an experiment he made with one of the Tasmanian planarians, which he cut into two nearly equal halves; these, in the course of twenty-five days, were all but indistinguishable, when the increased heat on approaching the equator put a stop to his observations (Voy. of a



...to journey to it,  
it, instead of having it always at hand  
follows, therefore, we have included  
Darwin and Professor Moseley, partly  
list complete, but chiefly because we hope  
of some of our country members in collecting  
interesting animals, as the species are  
the descriptions. Such large tracts of  
and are being yearly cleared and burnt  
means extermination to animals of fresh  
planarians, that unless residents in the colony  
it is almost certain that some of the most  
otherwise be rescued from oblivion. In  
other terrestrial invertebrates have been  
times in the history of the colony, and  
been more or less completely modified by  
and the wholesale destruction of the timber  
case with planarians. The northern coast  
colony especially will probably yield a  
one in a position to search for them systematically  
glad therefore to receive any information  
specimens sent alive by post, or put in  
alcohol (1).

---

## GEOPLANA (altered from Stimpson).

“Corpus depressum, vel depressiusculum, elongatum vel lineare, capite continuo. Ocelli numerosi, marginales, vel submarginales; vel in parte anteriori corporis solum, vel passim circa corpus, singulatim plerumque, nonnunquam in acervos dispositi” (1).

## 1. GEOPLANA TASMANIANA, Darwin.

*Planaria Tasmaniana*, Darwin, Ann. Mag. Nat. Hist., 1844, xiv, p. 346; *Geoplana Tasmaniana*, Schultze l.c. p. 7; *G. Tasmaniana*, Moseley. l.c. p. 289.

“Mouth-sucker widely extensile: alimentary orifice placed nearly in centre of the body; genital orifice  $\frac{1}{10}$  inch posteriorly, but when the animal crawls it is  $\frac{3}{10}$  inch distant. Genital orifice very distinct submargined. Ocelli scattered round the entire margin of the foot, but most frequent at the anterior extremity. Both extremities pointed. Colour dirty honey-yellow with a central dark brown line bordered on each side with a broader line of pale umber-brown: foot quite white. Length when crawling  $1\frac{5}{10}$ , when contracted  $\frac{8}{10}$  inch.”

*Hab.*—Beneath decayed trees in the woods of Van Diemen's Land: frequent in February (Darwin).

## 2. GEOPLANA CÆRULEA, Moseley.

(Plate v, fig. 1).

*Cænoplana cærulea*, Moseley, Quart. Jour. Micro. Sc. 1877, p. 285.

(1) Gulliver, Phil. Trans. Vol. 168, p. 562.

The following is Mr. Moseley's definition of the genus *Cænoplana* :—

“Body long and worm-like, much rounded on the back, flattened on the under surface, without an ambulacral line; external longitudinal muscular bundles largely and evenly developed over both dorsal and ventral regions; lateral organs as in *Rhynchodemus*; eyes absent from the front of the anterior extremity, but present in two lateral elongate crowded patches placed just behind the anterior extremity, and scattered sparsely on the lateral margins of the body for its entire extent; mouth nearly central, pharynx cylindrical.” *Hab.*—N.S.W.

specimens of this planarian  
alive have the immediate anterior ex-  
orange-red, darker towards the tip; in  
visible with a lens; the colour more o  
in spirit. Quite recently, however, on  
have found on the pavement in Hyde  
at Captain Cook's statue a number of  
teen altogether), which are without the  
median stripe varies from a dirty  
changing to white in spirit. In the  
extremity against the dark-blue backgr  
under a low objective, and in living  
referred to has probably been stock  
from the Botanic Gardens, but we  
locality. The differences in living sp  
seem to be constant, and are sufficient  
variety of the other, if not to separate  
In spirit specimens, however, the differ  
ceptible, and we do not know whether  
both or not. As Mr. Moseley does not  
we have not had the specimens without  
among the material given us by Mr. Ma  
the Park, we are not even sure which  
sidered the typical form. From its com  
suppose the former with the

The largest specimen we have had when alive and crawling was 11.5 cm. long. The Queensland specimens are in the Macleay Museum, and were collected by Mr. Froggatt, who, however, did not find any other species. Mr. Moseley's locality is "Parramatta, under the bark of a species of Eucalypt." The rest we have added.

### 3. GEOPLANA SANGUINEA, Moseley.

*Cænoplana sanguinea*, Moseley, *op. cit.* p. 285.

"Closely resembles *G. cærulea*, with the exception that it is coloured of a uniform light red, which is lighter upon the under surface of the body. Actual length living, 7 cm.; breadth, 4 mm."

*Hab.*—"Parramatta, amongst earth at the roots of a Eucalyptus stump" (Moseley).

We have never met with an example of this species.

### 4. GEOPLANA SUBVIRIDIS, Moseley.

(Plate v, figs. 2 and 2').

*Cænoplana subviridis*, Moseley, *op. cit.* p. 285.

"Ground colour of the body greenish-yellow beneath. In mesial line of the dorsal surface is a broad band of the ground colour, bordered on either side by a somewhat narrower but very sharply defined intensely black band. Beyond the black bands externally on either hand lie bands of the ground colour of equal breadth to them; and beyond these again is a very broad band which extends outwards nearly to the lateral margin of the body, which band is composed of a shading of fine longitudinal streaks of reddish-brown, and is bordered on either side by a narrow, dark, nearly black margin, the inner border being more intensely pigmented of the two. The bands and lines become narrower and more indistinct towards the posterior extremity and eventually

... says of his specimens  
bark of Eucalypts." We have had s  
smaller than those mentioned above ;  
when living and extended.

##### 5. GEOPLANA VARIEGATA

(Plate v, figs. 3 and 4)

Undersurface white or cream-coloured  
to greenish-yellow at the margins. In  
dorsal surface is a very narrow linear  
yellow or greenish-yellow, bordered on  
wider but still narrow linear stripe of  
brown, its inner margin the straight  
external to each of which again is a  
yellow, twice or three times the width of  
in turn are each bounded externally  
extending outwards nearly to the lateral  
which band consists of an inner very dark  
in width about  $\frac{1}{3}$  of the whole, an outer  
defined but less intensely coloured, and  
consisting of numberless fine irregular  
with blotches and patches of the yellowish  
through ; beyond each of the broad bands  
pale or greenish yellow. The median  
anterior

Length of largest specimen when living and crawling 17 cm.; breadth 5 mm.; the same in spirit 13·8 cm. long, 7 mm. broad; length of smaller specimen 2·6 cm., breadth 2 mm.; we have had various intermediate sizes. In a specimen 7·5 cm. long the oral aperture is 25 mm. behind the anterior extremity, and the generative aperture 13 mm. posterior to the mouth.

It is difficult to express accurately the exact tints of the dark bands in living specimens; they appear of various shades of brown yet tinged with dark green; sometimes they are almost sage green. In spirit specimens all the yellow and green tints are lost; the ground colour becomes whitish or cream colour, and the dark bands various shades of brown.

*Hab.*—County of Cumberland, Springwood, Mt. Wilson, Hartley Vale, Capertee, Burrawang.

This fine species resembles *C. subviridis* in the general character of the markings, but differs in their arrangement, the narrow median stripe with its narrow bordering dark stripes in the one case, markedly contrasting with the broad median stripe with its intensely dark and relatively broader stripes in the other. The new species has also the dark inner margin of the broad bands wider.

#### 6. GEOPLANA SULPHUREUS, n. sp.

Ground colour above and below of a uniformly bright gamboge-yellow. In the median dorsal line a narrow band of ground colour bordered on either side by a dark reddish-brown line as wide as the median stripe; external to each of them is a band of ground colour about as wide as the median stripe and its two dark bounding lines taken together; beyond which again on either side is an intensely black band, about as wide as the stripe of ground colour which it bounds externally: the bands become more or less confluent just at the posterior extremity, while just anteriorly they are obscured by the orange-red tint which colours

Undersurface whitish. Ground considerable variations, pale yellow or near ochreous-brown, reddish-brown, sometimes dorsal surface divided into six longitudinal lines, also varying in colour, sometimes intense tint of the ground colour, from to warm brown or red, their margins in a lens, arranged as follows: usually a very median line, external to which on each side colour; outside of which again on either or red usually slightly broader and better line; each of these again is bordered by a band and a-half times or twice as wide as the first beyond each of which is the outermost band as the first on each side but some of these is followed by a narrow band of outwards to the lateral margin of the extremity the lines blend in the red tip. the reddish tint of the anterior extremity or less completely in spirit, while the sometimes black.

Largest living specimen 10 cm. long.  
specimens 40 - 100

Young specimens on emerging from the cocoon are 2·5 to 4 mm. long. In these and sometimes in larger ones the colour of the anterior portion of the body is more intense. In very young specimens also the lines are brighter, but the outermost one on each side is only faintly indicated, or absent.

*Hab.*—Near Parramatta, near Springwood, near Capertee, Guntawang, Beaudesert Hills, Biraganbil Hills, N.S.W. ; Sandhurst, Victoria.

This is one of our commonest species, and notwithstanding the variations in the tints it is easily recognised by the five linear stripes. At present we are unable to distinguish varieties, or more than one species by definable characters, but when we have been able more systematically to compare adults and young ones from various localities it may be possible to do so. For three Victoria specimens we are indebted to Mr. Froggatt. They resemble some of our N.S. Wales examples in having the ground colour rather dark both above and below, and in having the median line as broad as the others, and more intensely coloured, almost black.

8. *GEOPLANA VIRIDIS*, n. sp.

(Plate v, figs. 6, 13, 14).

Ground colour below pale greenish-yellow or in some specimens pinkish ; above bright grass-green. In the mesial line of the dorsal surface is a fairly broad band of ground colour bounded on either side by a fine line of bright burnt sienna ; external to which on either side is another band of ground colour about of equal width with the mesial band ; beyond each of these again another sienna line sometimes consisting of separate dots of pigment, so that these lines as compared with the inner ones are not so intense in colour or are even broken ; external to each of them is another band of ground colour extending outwards to the lateral margin of the body, slightly narrower than the median band. The lines converge slightly towards the centre, and those of each side become confluent just at the anterior extremity, and of a slightly brighter colour, and



mouth 12 mm.

Some spirit specimens retain the colour usually more or less completely taken up, but fade considerably.

*Hab.*—Guntawang, N.S.W.

From the banks of an anabranch of the

We have a number of specimens for description; in addition we have many. Firstly, we have a few specimens in which on each side is wanting. Secondly, we have which the ground colour is pale green with four sienna lines. Some of these however are specimens, as the few young ones so far seen are or pale greenish above, and have the two lines and distinct only anteriorly, while posteriorly the outer lines when present, are broken

#### 9. GEOPLANA ORNATA,

(Plate v. fig. 7).

Undersurface very pale yellowish. (Plate v. fig. 7).  
surface pale sienna. A median line

somewhat interrupted line of the same width and tint as the median stripe; beyond which again is a narrow band of ground colour of a paler shade sometimes bordered externally by an interrupted line like that previously mentioned, extending outwards to the lateral margin of the body; the sides of the body a paler shade of ground-colour marked with darker dots. Except that of the undersurface, the colours are fairly well retained in spirit specimens.

A living specimen alive and extended 5.5 cm. long, 3 mm. broad.

*Hab.*—Hartley Vale, N.S.W.

10. *GEOPLANA VIRGATA*, n. sp.

Undersurface pale brownish yellow. A narrow median longitudinal stripe of umber; on each side of which lies a band of a lighter tint, and of about twice or thrice the width, marked with narrow broken longitudinal lines, and bounded externally by a darker broken line; outside the latter on either side a narrow band of pale brown free from longitudinal markings, and bounded externally by another darker broken line, outside which again is a band marked with short fine longitudinal markings.

Crawling and extended about 2.5 cm. long, 3 mm. wide.

*Hab.*—Hartley Vale.

From under logs on a swampy flat.

11. *GEOPLANA MUNDA*, n. sp.

(Plate v. fig. 8).

Undersurface greyish in centre, yellowish towards the margins. Above there is a narrow median dorsal line of pale olive-brown, bounded on either side by a very fine dark line, external to which is a broader band of a slightly darker brown, and this is bordered externally by a very dark brown line which gradually merges into a rather broad band of very dark brown which fades gradually towards its outer margin.

This pretty little planarian retains its colours in spirit very well but the undersurface becomes quite white. The single specimen

obtained measured when alive and crawling, 2.5 cm. long, and 3 mm. broad. In spirit it measures 15 mm. long, 4 mm. broad, the mouth 6 mm. behind the anterior extremity, and the generative aperture 2 mm. behind the mouth.

*Hab.* — Hartley Vale.

From under a log and almost in the water on a swampy flat.

12. *GEOPLANA RUBICUNDA*, n. sp.

Body tapering gradually anteriorly, more abruptly posteriorly, convex dorsally, flat ventrally (or somewhat concave in the median line), thin, much depressed, contrasting markedly with *G. caerulea* in this respect. Dorsal surface of a bright brick-red, somewhat darker in the anterior portion of the body and in the median line, otherwise fairly uniform; no indication of any stripes; undersurface of a lighter tint; in spirit the colours fade considerably. Eyes smaller and more difficult to make out than usual.

Length of a living specimen extended 60 mm., breadth 2 mm.; the same specimen in spirit 38 mm. long, 3.5 wide, aperture of

have lost the red tint, and are fulvous. More or less of the under-surface in all the specimens is concave in the median line, but this may perhaps be due to contraction, though we have not noticed a similar effect in other species.

We do not think this can be Moseley's *G. sanguinea*, as it cannot be said to closely resemble *G. cærulea*, the body being more depressed, and the oral aperture further back than in that species.

### Genus RHYNCHODEMUS.

*Rhynchodemus*, Leidy, Proc. Acad. Nat. Sc. Philad. v, 1851.

"Corpus elongatum, sub-depressum, antrorsum attenuatum, utrinque obtusum. Ocelli duo subterminales."

#### 13. RHYNCHODEMUS MOSELEYI, n. sp.

(Plate v. figs. 9 and 10).

Undersurface whitish. Entire upper surface dark olive-green almost black. A very narrow mesial dorsal black line bounded on either side by a much wider stripe of ground colour; external to each of these stripes a black line slightly broader than the median one, beyond which again the ground colour extends to the lateral margin of the body. The ground colour is so dark that the longitudinal lines are difficult to detect.

Length living 3.3 cm. long, 3 mm. broad.

*Hab.*—Beaudesert Hills, Guntawang, N.S.W.

#### 14. RHYNCHODEMUS COXII, n. sp.

Above shining black with two narrow longitudinal azure-blue lines enclosing a very narrow median longitudinal stripe of the ground colour; viewed with a lens the ground colour is seen to be dotted with minute azure-blue specks, while the azure lines have their margins ill-defined and somewhat irregular, and appear as if dotted with black; the lines continue right to the posterior extremity, but begin some little way behind the anterior one which is not coloured reddish. In spirit the lines become white.

...the opportunity  
Mt. Wilson, and whose enthusiastic help  
we gratefully acknowledge. The specimen  
died unexpectedly before its  
the anterior extremity breaking off, so  
the characters of its eyes. It may  
*Geoplana*, but as we cannot see any eyes  
in spirit, it is provisionally placed here  
examples.

#### 15. *RHYNCHODEMUS OBSOLETE*

Undersurface almost white. Dorsal  
grey shading to black, darkest in small  
large specimens in which the colour  
anterior portion of the body; with a more  
darker longitudinal line; the lateral more  
lighter, gradually shading into the white.  
In spirit the colour changes to dull  
body is relatively broad and flattened;  
quite slender, and then the posterior  
than the anterior one. No ambulacral  
whole undersurface as a sole.

Length of two of the largest specimens  
8 cm. and 5.4 cm. respectively, 3 and 2 n  
... 20 mm ...

16. *RHYNCHODEMUS GUTTATUS*, n. sp.

Undersurface much spotted irregularly with numerous small blackish dots on a whitish ground. In the median line of the dorsal surface is a very narrow jet black stripe bordered on either side by a slightly wider but narrow white linear stripe sparingly dotted here and there with minute black spots visible with a lens; external to each of these again is a broad band of shining black, towards and at the extremities much broken up into numberless small black spots and blotches; beyond each of these is a narrow lighter blotched band on the side of the body. The margins of all the bands and stripes somewhat ragged: the white stripes disappear near the extremities.

Two specimens alive and extended 4 cm. and 2 cm. long respectively, 2 mm. broad; the former in spirit is 14.5 mm. long, 3 mm. broad, the mouth 8 mm. behind the anterior extremity, the genital orifice 3 mm. posterior to the mouth.

*Hab.*—Springwood, N.S.W.

We have twice seen at Mt. Wilson what we believe to be a specimen of this species, but on both occasions it disappeared before it could be examined. Another specimen sent us by Mr. Cox is damaged, and we are therefore doubtful about their identity. The white stripes at once distinguish this species from any of the others.

17. *RHYNCHODEMUS TRILINEATUS*, n. sp.

(Plate v. figs. 11 and 12).

Undersurface whitish flecked with black spots. The dorsal surface with a broad shining dark purplish-brown almost black band, which shows a median, and on each side a marginal, linear longitudinal black stripe; beyond which on each side a narrow lighter band, the lines of demarcation formed by the marginal stripes very conspicuous, and anteriorly at the level of the eyes. Length crawling and extended 3 cm., broad 2 mm.

*Hab.*—Guntawang.

EXPLANATION OF 1

All the figures are of the natural size and otherwise stated.

Fig. 1.—*Geoplana cærulea* (blue-tipped varie

Fig. 2.—*G. subviridis*, from a small spirit spe

Fig. 2.'— „ „ (enlarged diagram shew

Fig. 3.—*G. variegata*, from a small extended

Fig. 3.'— „ „ (diagram shewing the 1

Fig. 4.—*G. quinquelata*, from a very large livi

Fig. 5.— „ „ from a small spirit speci

Fig. 6.—*G. viridis*.

Fig. 7.—*G. ornata*.

Fig. 8.—*G. munda*.

Fig. 9.—*Rhynchodemus Moseleyi*.

Fig. 10.— „ „ anterior extre

Fig. 11.—*R. trilineatus*.

Fig. 12.— „ „ anterior extremity ( $\times 5$ )

Fig. 13.—*G. viridis*, anterior extremity of sp  
( $\times 2$ ).

Fig. 14.—*G. viridis*, anterior extremity of yo  
( $\times 2$ ).

Fig. 15.—*G. quinquelineata*, anterior extrenit

Fig. 16.— „ „ anterior extreni

## NOTES ON AUSTRALIAN EARTHWORMS. PART III.

BY J. J. FLETCHER, M.A., B.Sc.

Since my last paper appeared I have been able to see the papers of H. Ude (1) and Dr. Rosa (2). The former mentions (pp. 133 and 134) his having received from Sydney, N.S.W., specimens of *Allobophora foetida* Sav., and *A. turgida* Eisen. (3) The latter points out that the species which, for lack of opportunity of consulting any of the papers in which it has been described, I at first supposed was the *Lumbricus Novæ-Hollandiæ* of Kinberg, and which, subsequently finding this not to be the case, from its wide distribution in this colony I supposed was indigenous, and referred to it in my second paper as *A. australiensis* n. sp., is the same as one of these mentioned above by Ude, namely the European species *A. turgida*, Eisen. Therefore, if we except Kinberg's doubtful species, no indigenous antecitellian worms are known as yet from Australia, the three species of such worms which have already become established in various parts having been introduced. Of these, *A. turgida* is spreading with extraordinary rapidity and has completely outstripped the other two. Indeed taking into account its feebler powers of locomotion, and that it was not intentionally introduced, the rapid distribution of this worm is as remarkable as that of any of our interlopers. In this colony I have examples of this worm from almost every locality from which I have obtained or received earthworms, with the exception of a few favoured spots

---

(1) "Ueber die Rückenporen der Terricolen Oligochaeten," in Zeitschrift für wiss. Zool. Band XLIII, 1885, p. 87.

(2) "I Lumbricidi Antecitelliani in Australia," in Bol. dei Musei di Zool. &c. R. Università di Torino, Vol. I, No. 18.

(3) Incorrectly referred to as *Allobophora* in my two previous papers.



... .. has long since escap  
taken to bush land which has never been  
it has become established my experience  
species are more abundant than indige  
established itself in the other colonies,  
brought me specimens of it from Sandhurs  
Rennie has also sent me a number of exam  
at Adelaide. Ude states that he has a  
it from Milwaukee U.S.A. and Mexico.  
referred to by an American writer in "  
extracts from whose letter are quoted in  
my first paper. On the occasion of my las  
though I have never met with antecitell  
on turning over a patch of cowdung by  
sandstone country and at some distance  
Mr. Cox noticed thirty or forty small  
belong to this species. I took ten speci  
though the largest of them (in spirit) is  
all have girdles commencing with xxv or x  
or xxxii (in one case xxiv-xxviii).

The other two species of *Allolobophora* v  
seem to have spread beyond the gardens of  
Ude received examples of *A. foetida* Sav.  
Sydney. All the examples I have seen

from one of the Sydney nurseries, and from one of the enclosures in Hyde Park. It does not agree exactly with any of the descriptions I can find, but seems to come nearest the *A. profuga* of Rosa.

From two of these gardens I have numerous specimens of a species of *Perichæta* (*P. peregrina*) which is supposed to have come from the Mauritius, and which I have already described. In this paper I describe another possibly introduced species only known to me at present from specimens from Mr. Macleay's garden in Sydney, from some which Professor Rennie has sent me from Adelaide, and from Mulwala. It differs from any other worm I have yet seen from Australia in having the male pores on the seventeenth segment.

In what follows I give descriptions of ten new species of indigenous worms, as before taking note of the more prominent anatomical characters, but, in the hope of acquiring additional types, leaving the consideration of morphological details until I come to revise the whole. Of these all but two belong to the genus *Perichæta* the most abundant Australian type, of which I have previously described several species. They comprise species from N. Queensland, New South Wales, and South Australia, and one of them (*P. canaliculata*) collected by Mr. Froggatt in N. Queensland is especially interesting because it is intra-clitellian. Of another species from Mt. Wilson, which I here describe, all the specimens obtained were postclitellian with a solitary exception which was intrac clitellian. These two species therefore are of considerable interest because they add additional strength to the view put forward by Beddard, who has met with a similar experience to mine, in the case of the species of *Acanthodrilus*, that while Perrier's distinction between antec clitellian and the other two groups into which he has subdivided earthworms is valid enough, his division between the intrac clitellian and postclitellian groups is too artificial to be permanently retained, even though in the present state of our knowledge of these animals it may be convenient for the time being to make use of it.

found at Mt. Wilson, in which I have as  
either gizzard or spermathecæ. As I wi  
genera I provisionally refer it to the ge  
at present consists of a somewhat hete  
species whose common characters so far a  
postclitellian ; have eight rows of setæ, no  
at considerable intervals apart ; a single  
that they have the male pores open  
segment.

I have to acknowledge the valuable assis  
various quarters. For entirely new mat  
tunity of obtaining it I have especially to  
of Raymond Terrace, the Hon. W. Macle  
Mr. J. D. Cox, Mr. A. G. Hamilton, Profi  
Stirling, Dr. E. P. Ramsay, Mr. Masters, an  
less am I indebted to Mr. J. D. Ogilby,  
several other gentlemen for specimens of w  
new, were from new localities.

#### EUDRILUS (?) DUBIUS, n.

The largest (moderately contracted spi  
60 to 65 mm. long, 4 mm. broad, and compri  
several smaller ones.

Body cylindrical, and of nearly uniform girth, but tapering slightly just near the extremities.

Prostomium pear-shaped, dividing the buccal ring for a little more than half its width ; the buccal ring as wide as the following segments, which are more or less conspicuously tri-annulate.

Clitellum comprising three complete segments, XIV-XVI, and including more or less of XIII and XVII ; of XIII sometimes almost the whole of it ; of XVII only just the anterior margin, or enough to include the male pores, but in no specimen was the whole of it included ; thick and complete all round, usually hiding both the setæ and the boundaries of the segments.

Setæ of the ordinary character, about .39 mm. long, with a slight enlargement at about  $\frac{1}{3}$  from the free tip, in eight longitudinal rows, of which on each side two are ventral, one lateral, and one is dorsal ; the first row on each side about as far from the median ventral line as the second row is from the first ; the interval between the second and third rows somewhat less than twice that between the first and second ; the fourth row about midway between the median dorsal line and the third row, the interval between the third and fourth wider than that between the first and second, but not so wide as that between the second and third. From about segment XXI or XXII forwards the setæ of the second row on each side stand gradually successively closer to the corresponding setæ of the first row until on segment XVIII the interval between the two rows has diminished to about half ; on XVII the first and second setæ on each side not visible ; from XVI the second rows diverge again until at about segment XII the setæ stand at the ordinary distance apart.

The two male pores are on two slight elevations on segment XVII, not conspicuous, hardly noticeable without a lens, just dorsad of the first row of setæ. The two oviducal pores are on XIV, in front of and in line with the first seta on each side. Spermathecal apertures and dorsal pores not visible. Nephridiopores very distinct, a row on each side commencing after segment IV, close to the anterior margins of the segments, and a little ventrad of the third row of setæ.

Alimentary canal : the buccal mass and pharynx occupy about five segments ; the portions of the alimentary canal in vi vii and viii straight and thin-walled ; a gizzard I have been unable to make out ; in each segment from ix to xiii the alimentary canal is globularly dilated and very vascular, less marked in xiii, (and slightly also in xiv and xv) probably representing the calciferous glands though separate pouches on each side are not pinched off ; in xvi it suddenly increases in calibre to form the sacculated large intestine which continues to the end of the body.

Genitalia : two pairs of small white racemose testes in segments xi and xii, attached to the posterior face of the mesenteries between x and xi, and xi and xii, on each side of the alimentary canal (1) ; the two vasa deferentia commencing with two pairs of ciliated funnels in x and xi immediately in front of the posterior mesenteries, and joining the short genital ducts a little way from the prostates, the prostates are two small narrow bodies in xvii, transversely placed, the short duct of each coming off from the inner (lower) extremity, and joined about half the distance from the gland

The last pair of hearts is in segment XII; in this and also in X and XI they are very large, and originate in part from the supra-intestinal vessel in these segments. The segmental organs comprise a pair of coiled tubules in each of the segments but a few of the anterior ones.

*Hab.*—Sydney, Mulwala, N.S.W.; Adelaide S. A. (possibly introduced).

It is uncertain whether this worm is indigenous, as so far I have had specimens only from gardens. Those from Mulwala, sent by Mr. Sloane, were from a garden to which at one time plants had been brought from Melbourne. It is a remarkable little worm, which as it has a pair of male pores on segment XVII, and I can find no spermathecae of the ordinary character, is referred to Perrier's genus *Eudrilus*; but it differs in several points from any of the three or four species of this genus yet described, as for example in having no bursa copulatrix, and in not having the spermathecae connected in a remarkable manner with the oviducts. At present I can identify neither a gizzard nor spermathecae in any of my specimens. The distinction between intracitellian and postcitellian is a very fine one indeed in the case of this species, as in none of my specimens is the segment which bears the male pores wholly included in the clitellum, though the pores themselves are more or less completely; so that while the worms are always unsatisfactorily postcitellian yet they are often not altogether satisfactorily intracitellian.

#### CRYPTODRILUS RUBENS, n. sp.

A good (spirit) specimen is 55 mm. long, 4 mm. wide; comprising 114 segments. The pear-shaped prostomium divides the buccal ring for more than half its width.

Colour of the anterior portion of the body dark red, most noticeable in front of the girdle, in the posterior half of the body as well as on the under surface the colour much lighter.

closer to each other than do the tl  
between the third and fourth about  
and third, and about twice that betw

On xviii a pair of conspicuous somev  
with several circular groves; on the su  
papilla (perhaps only the everted te  
duct) on which are the male pores at  
row of setæ; a second and third s  
papillæ, one immediately in front, th  
the median one, each with a pore t  
penial setæ are extruded. Oviduct  
thecal pores not determinable. Dors  
pores not visible.

Alimentary canal: the buccal mass  
about the first four segments; in vi  
globular portion either or both of which  
calciferous glands in segments x-xiii  
and conspicuous; the intestine is quit  
segments, while in xvi the large inte  
and continues throughout the rest of t

Genitalia: a single pair of testes  
racemose bodies independent of eac  
posterior face of the mesentery between  
pair possibly overlooked; ciliated re  
deferentia not visible; prostates a pair  
disposed bodies in xviii

ovaries have the usual situation in XIII; the oviducts commence opposite them in the same segment and open to the exterior in XIV; spermathecæ not visible. Lying beside each genital duct are two small sacs each containing two penial setæ about .7 mm. long gradually tapering to a fine point.

The last pair of hearts is in XII.

Segmental organs consisting of a pair of convoluted tubules in each of the segments with the exception of a few anterior ones.

*Hab.*—Mt. Wilson.

This interesting little worm is the only one with eight rows of setæ as yet forthcoming from this locality. When alive it resembles in appearance the small perichæte worms. So far I have been able to examine only a few small spirit specimens, a number of living specimens which I brought down after my last visit having unfortunately died before I could examine them. The spermathecæ and gizzard may have been overlooked, but so far I have not been able to find them.

PERISSOGASTER EXCAVATA, g. et sp. n.

Three (spirit) specimens from the Hunter are 69 mm., 195 mm., and 250 mm. (a softer specimen) long respectively, and 3 mm., 13 mm., 15 mm. broad respectively, and comprise about 160 to 175 segments. A (spirit) specimen from the Hawkesbury is 334 mm. long, 15 mm. broad, and comprises 195 segments.

Prostomium wide, slightly depressed, ribbed by about five somewhat irregular longitudinal grooves, dividing the anterior annulus of the buccal ring. The latter is ribbed anteriorly by longitudinal grooves; superiorly and laterally it is marked with a slight transverse furrow at about  $\frac{1}{3}$  from its anterior margin, incompletely dividing it into two annuli, and limiting the prostomium posteriorly. Segments broadest in the anterior region of the body, especially from about III to XVII; the first three segments bi-annulate, II and III with the setæ towards the posterior margin



of the anterior annuli; after iv for some distance the segments are tri-annulate with the setæ on the middle annuli, sometimes a faint indication of four annuli; behind the girdle the segments are narrower, tri-annulate, or sometimes bi-annulate, or quite posteriorly even smooth.

Setæ with a slight sigmoid flexure, about 0.7 mm. long, with a slight enlargement about  $\frac{1}{3}$  from the free end, the width again increasing slightly a little further back, then diminishing gradually a very little towards the imbedded end; in eight longitudinal rows forming two pairs, those of each outer pair a little further apart; the first row on each side about 2 mm. from the median ventral line; the second row about 1 mm. from the first; the third about 3 mm from the second; the fourth about 1.5 mm. from the third; thus even the outer pairs are scarcely or only just lateral in position.

Clitellum absent in the smallest specimen; in the others commencing with the posterior annulus of xiii and taking in just

of accessory copulatory organs, and also appear to carry indistinct pores. In the smallest specimen none (or perhaps the anterior one only) are visible. Thus two of the specimens are intracelitellian, but one of the others with a not fully developed girdle is not so.

Oviducal pores two, 2 mm. apart, on either side the median line on XIV, and close to the posterior edge of the anterior annulus of this segment. Spermathecal pores two pairs, opening into the grooves between VII and VIII and VIII and IX, but situated on the anterior margins of VIII and IX, in line with the first row of setæ, ventral in position.

Dorsal pores none; nephridiopores not discernible.

Alimentary canal: the buccal mass and pharynx occupy the first four segments, the pharynx anteriorly and superiorly coated with a glandular mass possibly salivary glands, bounded posteriorly by the first recognisable mesentery between IV and V, the pharyngeal muscular bands very strong and numerous, those from the latero-posterior region arranged in four more or less complete circular rows, and passing through the first second or third or all three mesenteries to their insertions on the body walls in segments V, VI or VII; in each of the segments just mentioned is a globular gizzard, the three gizzards and the pharynx connected by short pieces of œsophagus; from VIII or IX to XIV the piece of intestine in each segment shews a very vascular globular dilatation, probably calciferous glands, though lateral diverticula seem not to be separated off; the large intestine commences suddenly in XVI, and though of larger calibre than the preceding portion, part of it being coiled in cork-screw fashion, this appears at first sight in a contracted worm to be much greater than it really is; unprovided with cæca.

Genitalia: two pairs of racemose testes (in the specimen dissected 5 mm. long, by 1.5 wide) the anterior pair in IX attached to the anterior surface of the mesentery between IX and X, the posterior pair in XII attached to the posterior surface of the mesentery between XI and XII, those of each pair quite independent of each other, one

narrow and longer portion, much two segments XVIII and XIX, or as short duct comes off at about the junction of the gland ; the posterior were not visible : the two ovaries and the two oviducts commence opposite and open to the exterior in the next pairs in VIII and IX, stalked posteriorly, each with a short wide caecum may be more or less bifid or even tr

The mesenteries after the first two back as that between XIII and XIV are connected by interseptal bands ; the posterior but much thicker than the succeeding

There are hearts from V to XII, the anterior and these arise by two trunks, one from a small supra-intestinal trunk ; the posterior trunk, but in addition to the supra-lateral vascular trunks in the anterior

The segmental organs are apparently attached to the coelomic wall immediately behind the mesenteries, and most conspicuous in the posterior segments.

*Hab.*—Morpeth, and Hawkesbury.

earthworm with three gizzards, (1) because, among other points of difference, the latter has two pairs of male pores. For the specimens from the Hunter River I am indebted to the kindness of the Rev. K. A. Corner of Morpeth. For the opportunity of examining the single specimen from the Hawkesbury I have to thank Dr. Ramsay. I have had no information about the habits of these worms, which were probably obtained in both cases from the rich soil of the alluvial flats. (2).

*PERICHÆTA EXIGUA*, n. sp.

Three specimens (from the Blue Mts.) comprising 107-115 segments are about 6 cm. long, and 3-3.5 mm. broad; four others (from Randwick) comprising about 120 segments are from 4 to 5.3 cm. long, and 2.5-3 mm. broad; two others (from Manly Beach) of about the same dimensions, but both wanting the posterior portion of the body. Colour when alive bright red, lighter below. Prostomium nearly divides the buccal ring, the latter with a faint longitudinal groove in the median ventral line.

Clitellum of three complete segments, XIV-XVI, and slightly involving XVII in the lateral and dorsal regions, thick and complete all round in breeding worms so as to obscure setæ and dorsal pores.

Setæ commence with 20 per segment; this number may continue fairly constant, increasing a little way back to 21 or 22, or in a few specimens quite in the posterior region it may increase even to about 30 per segment; there is a well-marked median ventral interval throughout devoid of setæ; a dorsal interval is less well-marked though perceptible anteriorly, but in the hinder region of the body it is very little if any wider than the ordinary interval between two setæ.

---

(1) Quart. Jour. Micro. Sc. No. cv, August 1886, p. 94, pl. ix, figs. 31-42.

(2) After this paper was read the Rev. K. Corner sent me an additional and larger supply of these worms, which came too late to be utilised in drawing up the above description. They will however enable me to supplement it on a future occasion, when figures of this and of several other of the species referred to in this paper, will be given.

Male pores on papillæ on xviii, about in line with the 2nd or 3rd row of setæ on each side, or with the interval between them. Oviducal pores close together on xiv. Spermathecal pores a single pair, between vii and viii, corresponding with the interval between the 3rd and 4th rows of setæ on each side.

Dorsal pores after segment v.

Accessory copulatory structures comprise ventral thickening on x and xi; and on some or all of xvi xvii xix and xx there are other structures which are slightly different in the specimens from the three different localities: thus in Springwood specimens the ventral surface of xvii only, or of this and xix, is thickened and marked with a somewhat elliptical fossa extending outwards on each side to the second seta, with a well-marked rim, and sometimes a raised central portion, and apparently with a pair of pores. In four Randwick specimens the fossæ are on xvii and xx, while on xix in front of the interval between first and second row of setæ there appears to be a pore. In two Manly specimens the fossa is on xvi, while on xvii and xix there are two pairs of small

The last pair of hearts is in segment XII, the posterior three pairs much larger than the others.

*Hab.*—Springwood (Blue Mts.), Randwick and Manly Beach (near Sydney), N.S.W.

The specimens from these three localities agree very well except in regard to the accessory copulatory structures, which by themselves are of too variable a character to be relied on for purposes of classification. I therefore put them all in one species, though when more specimens are examined it may be possible to separate one or more varieties.

The only other worms with a single pair of spermathecae that I have seen, were sent to me by Mr. T. G. Sloane from Mulwala on the Murray. They comprise six (spirit) specimens from 54-91 mm. long, and 2-3 mm. broad, consisting of from 88-125 segments. They are not sufficiently well-preserved for very satisfactory determination, nevertheless I have been able to make out that they are closely allied to the above-described species but may be distinguished as

Var. MURRAYANA,

Differing from the typical form of *P. exigua* in having (1) the caeca of the spermathecae very long, almost filiform but slightly dilated distally, much longer than the principal pouches, (2) the testes in IX and XII instead of in consecutive segments, (3) the prostates narrower, less incised; and the genital ducts shorter, thicker, and less markedly bent in horse-shoe fashion. There are also slight differences in the details of the accessory copulatory structures, in regard to which however the specimens differ among themselves.

*Hab.*—Mulwala, N.S.W.

Mr. Sloane tells me that this species is common in spring about the edges of lagoons and marshes after the floods in the Murray subside, but is scarce at other seasons when the ground becomes dry.

segment II, and gradually becoming lighter, greyish. Prostomium divides completely.

Clitellum of three complete segments, a portion of XIII or of XVII, or of both.

The number of setæ varies considerably over the body, and slightly in different specimens. I have found two exactly alike in detail. The setæ about XIII normally appear to have 16 segments; after the first three or four there may be a constriction at the girdle; this number may increase to 22 a few segments further back; there may be a further increase eventually increasing in the posterior region to case 50. In front of the clitellum the setæ are very broad in this species, the dorsal ones. Behind the girdle the ventral ones are narrow and distinct throughout, whereas the dorsal ones become much as to become hardly noticeable. The setæ in the anterior region are thicker and longer than those further back.

The male pores are on papillæ on XVIII, between the first row of setæ. The oviducts open close to segment XIV. The two pairs of spermathecal pores are on segments VIII and IX, just ventrad of the first row of setæ.

ventral surface of xvii a pair of pores ventrad of the innermost setæ; a second pair on small papillæ just ventrad of the papillæ carrying the male pores; a third pair on minute papillæ on xix, in front of the line of setæ, and corresponding with the interval between the first and second setæ.

In other respects this species is like *P. australis*, except that there is an additional pair of calciferous pouches in xiii, and that the genital duct is differently disposed, as previously mentioned.

In a fresh specimen the calciferous pouches and the portion of the intestine in xiv presented a white and glistening appearance, the contents consisting chiefly of minute granules which effervesced on the addition of acid.

*Hab.*—Mt. Wilson.

I have already referred to this species in speaking of *P. australis*, from which, after having examined additional material, I find it to be readily distinguishable (1) by the greater breadth of the dorsal interval devoid of setæ in front of the clitellum and a corresponding decrease in the number of setæ, (2) the ventral position of the spermathecal apertures, (3) the presence of an additional pair of calciferous pouches, (4) the different position of the bend of the genital duct, (5) as well as apparently by accessory copulatory structures, which were absent in all the specimens of *P. australis* yet examined.

PERICHÆTA CANALICULATA, n. sp.

Thirteen (spirit) specimens varying from 9 cm. long and 8 mm. broad to 14.5 cm. long and 8 mm. broad; number of segments from about 120-160. Body cylindrical, tapering just anteriorly, and more gradually for a considerable distance posteriorly. Colour even in spirit specimens purplish or reddish-brown, paler below. Prostomium dividing the buccal ring very slightly; marked anteriorly and inferiorly by several (three or more) irregular longitudinal markings; superiorly with a median longitudinal groove, continuing sometimes across the buccal ring, or not on to this, or



pore on its posterior margin, so that the greater part of the body is marked by a longitudinal linear groove. In addition all the specimens show a median ventral grooving on the sides commencing at a variable distance (in some) from the girdle.

#### Segments in front of the girdle

Setæ on a conspicuous ridge just in front of the girdle, frequently the ridge not limited by a median ventral interval devoid of setæ throughout, its bounding rows of setæ three times the width of the interval anteriorly; the dorsal interval at first devoid of dorsal setæ in this region, further back the dorsal setæ appear throughout owing to gaps in the bounding lines are very irregular and sinuous. The setigerous segments appear normally to number about 24, increasing shortly to 30 in the most posterior segments to about 50 in the most anterior, liable to considerable variation as to the number of half-circles of setæ, but especially in the anterior portions of the setigerous ridges dissolving into a smooth; so that in a general way it may be said to have any number of setæ.

Clitellum complete in one specimen ; slightly developed and recognisable in two others ; absent in all the rest ; comprises five complete segments XIV to XVIII, and in addition takes in small portions of XIII and XIX ; as the male pores are on XVIII the species is therefore intraclitellian.

Male pores on two prominent papillæ about 5 mm. apart, in line with about the 5th or 6th rows of setæ, or with the interval between them ; setæ not visible on the ventral surface between the pores. Oviduct pores two, in the interval devoid of setæ, on segment XIV, close together, just in front of the line of setæ. Spermathecal pores three pairs, between segments VI and VII, VII and VIII, and VIII and IX, about in line with the 5th row of setæ.

Dorsal pores after segment v. Nephridiopores not discernible.

No trace of any accessory copulatory structures.

The alimentary canal comprises a buccal mass and muscular pharynx with its strong pharyngeal muscles occupying the first four segments, a long piece of œsophagus several times bent on itself, of which a short anterior portion is in v, and a much longer piece with the large gizzard in vi, the latter having immediately behind it the posterior mesentery of this segment, but pushing back it and the next two or three succeeding mesenteries which thus—in a contracted worm—come to lie close to each other, and causing a considerable displacement in these segments ; in segments ix to xv the small intestine presents calciferous glands, the portions in these segments being very vascular, globularly dilated, internally shewing ridges, but distinct pouches are not pinched off ; the portion in xvi is narrow ; while in xvii the large intestine suddenly commences ; this is without cæca, and being coiled in cork-screw fashion its apparent calibre is greater than it really is.

The first noticeable mesentery, thin and incomplete, is that between iv and v ; from about viii to xvi the mesenteries are somewhat thicker than elsewhere.

Genitalia : two pairs of testes in xi and xii, small white bodies (2.5 mm. long, and about 1 mm. wide in a specimen 12.5 cm.

consisting of spermatozoa appearing along with the ciliated rosettes ; in a considerable mass of spermatozoa but the ciliated rosettes appeared may have been accidental, or a consequence of the cessation of the brood in segment XVIII, each consisting of a smaller lower one from which the upper is joined at some distance from the genital duct the vas deferens ; the genital duct is at some distance, but just its proximal end forming a small horse-shoe, the convoluted ovaries two, in the usual position in no way in any way remarkable ; spermathecae only, in segments VII to IX, short, each with a very short but conspicuous

Attached to the posterior surface of segment XIII, one on each side, in a position that of the two pairs of testes in XI and the ovaries, I found in both specimens two white sacs, from their situation located rather larger pair of testes. From their position however they have nothing to do with the only granules, granular cells, and met with something similar in *P. B.*

Segmental organs consist of a pair of conspicuous coiled tubules in each segment except the first two or three; each tubule consisting of three well-marked portions, a short and tolerably straight portion, an enlarged vesicular portion, and a long convoluted narrow distal portion. The last two pairs of hearts in XI and XII are very large.

*Hab.*—Mossman River, Cairns District, N.Q. (*Macleay Museum*).

This is a remarkable and interesting species, the study of which I intend to take up again later on. Notwithstanding that it is normally intracelitellian it cannot be referred to *Megascolex* Templ. (redefined by Beddard) from which it differs among other things in having fewer setæ, and spermathecæ provided with cæca. On the other hand except for the girdle its characters are paralleled in some or other of the numerous described species of *Perichæta*, and it should not in my opinion be placed in a genus separate from them. I am inclined to think that it will eventually be desirable to restrict the genus *Perichæta* to the typical perichæte worms with complete circles of setæ and intestinal cæca, and to make a separate genus for the pleurochæte worms without cæca like the worm under consideration. At present I regard the latter as an example of what Beddard has already met with in *Acanthodrilus*, and as strengthening his view that Perrier's classification in so far as it relates to the separation of the Postclitelliani from the Intracelitelliani is too artificial to be ultimately retained.

#### PERICHÆTA STIRLINGI, n. sp.

Five (spirit) specimens from 10 cm. to 20 cm. long, 8-11 mm. broad, comprising from about 130-140 segments. The anterior dorsal portion of the body much darker, but the colours are bleached by the spirit.

Prostomium depressed, concave below, with a median longitudinal groove, and a transverse one at about half the distance from its anterior margin; divides the buccal ring for about  $\frac{3}{4}$  of its width.

First two or three segments without annulations, after which as far back as the girdle they may be triannulate; behind the girdle the segments are narrower and are tri- or they may be quadri-annulate.

Setæ of the usual character, about .35 mm. long, inconspicuous on the dorsal region making it difficult to count them; somewhat less numerous on the anterior segments, apparently from 30 to 40 per segment, a well-defined ventral interval devoid of them, about thrice the width of the interval between two setæ; the dorsal interval very irregular owing to its bounding rows of setæ not being straight, and to the gaps in the rows of setæ in this region.

Clitellum in the largest specimen comprising segments XIV-XVII together with the posterior half of XIII except on ventral surface; complete all round; indicated in the others only by the darker colour of these segments.

Male pores on XVIII, about in line with the interval between third and fourth rows of setæ on each side; pores of oviducts two,

this way occupying VI and part of VII ; in each segment from VIII to XIV the alimentary canal shows a globular dilatation, very vascular, probably functioning as calciferous glands, though lateral diverticula are not visible ; the portions of the intestine in XV-XVII are very thin-walled ; the large intestine suddenly commences in XVIII, and is without cæca.

**Mesenteries:** a thin incomplete one between IV and V, a complete but very thin one between V and VI, the next one thicker, the following seven as far back as the one between XIII and XIV very much thicker, the remaining ones very thin.

**Genitalia:** two pairs testes, in XI and XII, narrow elongate racemose or lobulated white bodies attached to the posterior faces of the mesenteries between X and XI and XI and XII, one on each side of the intestine, quite independent of each other ; ciliated rosettes in X and XI, quite free and unenclosed in any sacs (from other considerations the specimen dissected was evidently not breeding), the posterior portions of the vasa deferentia not discernible ; prostates a pair of long narrow rather flat bodies transversely disposed in XVIII, with a thick short genital duct coming off from the inner (lower) end ; just in front and for some distance behind the genital duct the floor of the body shews white elevations, accessory copulatory glands : the ovaries occupy the usual position in XIII ; the oviducts not determinable the worm being in rather too soft condition ; spermathecae three pairs, in VII-IX, stalked pouches, opening anteriorly, the posterior pair the largest, each with a small but conspicuous club-shaped cæcum nearly as long as the stalk of the principal pouch.

The last pair of hearts is in XIII ; from VIII-XIII a second supra-intestinal longitudinal vessel is apparent, from which in part arise the four posterior pairs of hearts. Very minute tufts of tubules attached to the coelomic wall appear to represent the segmental organs.

As in *P. canaliculata* in the specimen dissected there was a pair of symmetrically-placed stalked bodies on the posterior surface of

Dr. Stirling from whose garden t

PERICHÆTA RAYI

Two spirit specimens comprising, were 19 and 26 cm. long, respectively. When alive evidently of below. The prostomium all but superiorly marked with a longitudinal transverse one at a distance of about one-third from its anterior margin; inferiorly in the median line.

Clitellum well developed in both specimens; constricted in this region; comprising segments XVII, in one specimen not taking in the posterior portion of XVII, but in the other the ventral portions were less modified and were included.

Male pores on small papillæ on the first segment, at an interval between the first and second segments, but contiguous and at right angles to the midline like eminence running nearly across the segment but no pores are visible on it. The structures on the ventral portion of the segment are ellipsoidal thickenings each with a central pore.

three pairs of spermathecal pores are between vi and vii, vii and viii, viii and ix, in line with the second seta on each side. The dorsal pores commence after segment v.

Setae of the ordinary shape but with the sigmoid flexure not quite so marked as usual, less numerous, thicker and twice as long (0.93 mm.) and further apart in the anterior region; at first 28 per segment (sometimes 24) increasing posteriorly to about 36; a narrow space devoid of setae in the median dorsal line, at first about twice the width of the interval between two setae, but gradually diminishing posteriorly; in the median ventral line a slightly wider interval conspicuous throughout.

In regard to the divisions of the alimentary canal, the number and situation of the various reproductive organs, the vascular system, and the segmental tufts, this species sufficiently closely resembles *P. austrina* as not to call here for detailed description. The gizzard is in segment v as it is in that species, and not in vi as previously stated.

Nine mesenteries from the posterior one of vi to the posterior of xiv are very thick and muscular. Segments x and xi were crammed with masses of spermatozoa enclosed with the ciliated rosettes in each segment in a delicate membranous sac.

*Hab.*—Raymond Terrace, Hunter River, N.S.W.

With two specimens of this species I received several other perichæte worms, one at least of a different species, but too small and too soft for satisfactory determination at present; also a large number of specimens of *Allolobophora turgida*, all from the same neighbourhood, and for which I am indebted to the kindness of a lady.

*PERICHÆTA HAMILTONI*, n. sp.

A good (moderately contracted) spirit specimen comprising 148 segments was 14.3 cm. long, and 5 mm. broad; three other specimens out of a number found dead after a flood in the Cudgong River, less contracted and softer, were 28, 30 and 35 cm. long respectively and 6-8 mm. wide; the largest one comprising about 150 segments.



not quite so wide, noticeable thro

The male pores are on papillæ  
pair of papillæ on this segment b  
mens have the ventral portion  
pores on circular papillæ); papillæ  
only indistinct swellings on ix an

In other respects this species i  
no further description here.

*Hab.*—Guntawang, N.S.W.

Mr. A. G. Hamilton of Guntaw  
this species, informs me that three  
hundreds found dead in an anabrai  
December 1886 after a flood, the fi  
during a succession of dry seasons  
selves to what, in wet seasons, is th  
they had been dislodged, and drow  
mens sent had been dead some t  
hence they are not in very good co  
though the papillæ carrying the  
copulatory structures are slightly d  
to the same species as the other s  
the river-bank.

PERICHÆTA WILSC

Largest of eight (spirit) specimens

is intracitellian. Setæ at first 20 per segment, further back usually 24, and quite posteriorly sometimes about 28; ventral interval devoid of setæ conspicuous throughout, about twice the width of the interval between two setæ; dorsal interval at first wider than an ordinary interval, but posteriorly not so.

Two pairs of papillæ on XVIII, and a pair of copulatory papillæ on XVII and on XIX; on X a pair of rectangular raised areas with a groove between them, extending outwards to about 4th seta on each side.

There is apparently a fourth pair of calciferous pouches in XIII.

In other respects this species is like *P. austrina*.

*Hab.*—Mt. Wilson.

#### PERICHÆTA FECUNDA, n. sp.

Two (spirit) specimens from different localities are 74 and 65 mm. long, 3.5 and 3 mm. broad, and comprise 108 and 115 segments respectively. Body cylindrical, tapering slightly anteriorly, and more gradually posteriorly; colour darker above, especially anteriorly; when alive an iridescent steel-blue. Prostomium nearly divides the buccal ring, the latter inferiorly marked with a median longitudinal groove.

Setæ for about the first three setigerous segments 20 per segment, increasing to 24 just about the clitellum, with 28 a little way behind it, and about 30 per segment in the posterior region. Sometimes a few more setæ are visible on one side of a segment than on the other. Ventral interval devoid of setæ noticeable throughout, about twice the width of the space between two setæ; the dorsal interval anteriorly a little wider than that between two setæ, posteriorly not noticeable.

Clitellum complete, comprising three entire segments XIV to XVI and slightly involving XIII and XVII (in one case about half).

Male pores on XVIII, about in line with the interval between first and second setæ on each side. Oviduct pores two, close

extending outward from the first to t  
while the ventral surface of segments  
thickened, flattened, and some of these  
depression, and a pair of indistinct por

In one of the specimens dissected  
ferous pouches in x-xiv, the large in  
without cæca. Testes two pairs in ix  
x and xi, prostates two, in xviii and x  
thecæ four pairs, in segments vi to  
club-shaped cæca nearly as long as the  
pair of hearts is in xiii.

*Hab.*—Mt. Wilson, and Lawson, N.

ON A NEW *HOPLOCEPHALUS* FROM THE GULF OF  
CARPENTARIA.

BY WILLIAM MACLEAY, F.L.S., &c.

*HOPLOCEPHALUS CARPENTARIAE*.

Scales in 15 rows.

Abdominal Plates 183.

One Anal Plate.

Sub-caudals 31.

Length, 20 inches.

Tail,  $1\frac{1}{2}$  inches.

Of slightly depressed form. Head a little broader than the neck, body not much enlarged towards the middle, tail short, tapering to a fine point. Anterior frontal shields less than half the size of the posterior, a little emarginate in front to receive the rostral shield, and in contact with two-thirds of the nasal shield. The posterior frontals 5-sided, the anterior side in contact with the anterior frontals, the lateral with the hinder third of the nasal shield, the external posterior side with the preocular and superciliary shields, the internal with the vertical shield, and the inner side in contact with each other. The vertical shield is 6-sided and triangular in front and behind. The superciliaries are considerably shorter than the vertical and about half the width. There are two postocular and one preocular shields. The nasal shield is elongate and pointed behind. There are six upper and lower labial shields. The eye is of moderate size, the pupil almost round, and is in contact with six shields—the parietal, the two posterior oculars, the anterior ocular, and the third and fourth upper labials. The place of the loreal shield is occupied by

*STREPERA MELANOPTERA, Gould.*

This bird is found breeding in South Australia. It constructs a large open nest of sticks and twigs, lined inside with fibrous roots and grasses, and usually placed in the topmost branches of a Eucalypt. Two eggs of this species in the Dobroyde collection, taken by Mr. Gardner in 1863, are similar in form to those of *S. arguta* ; they are of a light purple or rich vinous-brown ground colour, with large irregularly shaped markings of slaty-brown evenly dispersed over the surface of the shell. Length (A), 1·6 × 1·18 inch ; (B), 1·65 × 1·19 inch.

*RHIPIDURA DIEMENENSIS, Sharpe.*

Two eggs taken near Hobart in October, 1885, are of a dull white colour, thickly freckled all over with creamy-brown markings, but more particularly towards the larger end. Length (A), 0·61 × 0·47 inch ; (B), 0·6 × 0·47 inch.

*MALURUS CYANOCHLAMYS, Sharpe*

A nest of this species now before me, taken from the Australian Museum collection, is a dome-shaped structure composed of the dried wiry stems of a *Drosera*, and the flowering portions of the *Banksia* cones, spiders' webs, &c., all matted up together, and lined inside with the white downy seeds of some composite plant. It measures exteriorly four and a-quarter inches in height, by three inches in width; the aperture which is oval and near the top being one inch high, by one and a-quarter inch in width. The nest is firmly packed in the upright forked branches of a *Banksia*, and was placed about five feet from the ground; it contained two eggs of a fleshy-white ground colour, freckled all over with irregularly shaped markings of a reddish-brown, particularly towards the larger end where they form a well-defined zone. Length (A),  $0.7 \times 0.52$  inch; (B),  $0.69 \times 0.52$  inch.

I have described the above nest and eggs upon the authority of Mr. Geo. Masters, who assures me there is not the slightest doubt about them, he having personally taken them on the 3rd of Dec., 1868, at King George's Sound, Western Australia.

Mr. Gould in his 'Handbook to the Birds of Australia,' Vol. I., p. 371, writes of the nest of this species, as being "composed of grasses lined with a few feathers, and the eggs five in number, of a white colour, slightly tinged with greenish grey."

I am inclined to believe that Mr. Gould has described the nest and eggs of some other bird, probably one of the *Ploceidæ* family, as neither the materials of which the nest is composed, nor the number and colour of the eggs, agree with what obtains in the case of the other members of the genus *Acanthiza*.

#### ACANTHIZA UROPYGIALIS, Gould.

For the eggs of this species I am indebted to Mr. K. H. Bennett, who procured them at Mossgiel, on the 15th of October, 1886. The nest, he informs me, was similar to that of *A. pyrrhopygia*, and was built in a low thickly-foliaged tree about five feet from the ground. Eggs three in number for a sitting, of a delicate fleshy-white, minutely freckled all over with light reddish-brown

like its ally *P. cincta* of the Easter low bushes, building a flask-shaped usually five eggs for a sitting. Egg in form, measuring as follows :—Length (B),  $0.65 \times 0.4$  inch; (C),  $0.69 \times 0.4$  inch; (E),  $0.65 \times 0.43$  inch.

September and the three following months form the breeding season of this species.

#### ACANTHORHYNCHUS D

Some ornithologists do not consider *A. d.* Gould, himself, who first pointed out its occurrence in Northern and Eastern Australian Colonies, believe them identical; but as the measurements of the former differ from all its admeasurements, and much more from those of the latter, I give the description of the former, near Hobart, in October, 1885.

Eggs two in number for a sitting, of light saturnine red on the larger end spotted with irregularly shaped markings and a few nearly obsolete spots (A),  $0.73 \times 0.53$  inch; (B),  $0.75 \times 0.53$  inch.

#### ZOSTEROPS FLAVOGULAI

This very distinct and well-marked species is abundant at Cape York and the adjacent islands.

cup-shaped structure composed of the dried skeletons of leaves, held together with spiders' webs, and neatly lined inside with fine wiry grasses, the whole exterior surface being covered with thin broad strips of perfectly white semi-transparent paper-like bark of a *Melaleuca*, which gives it a very beautiful appearance. Exterior diameter three one-eighth inches, depth two inches ; internal diameter one and three-fourths inch, depth one and a-half inch. The nest was attached by the rim to the thin branches of a shrub, about five feet from the ground. The eggs were two in number, but four is the full complement for a sitting, of a uniform pale bluish-green, both specimens giving exactly the same measurements, viz.: 0·72 inch in length, by 0·5 inch in breadth.

Through the kindness of the Hon. Wm. Macleay, I have been permitted to examine and describe a number of nests and eggs in the Macleayan Museum, from which the above description is taken. I am also indebted to Mr. George Masters, the Curator, for supplying me with all the available information relative to the taking of the same.

SITTELLA PILEATA, *Gould.*

For the nest and eggs of this species, together with the bird shot therefrom, I am indebted to Mr. James Hill, of Kewell, Victoria, who procured them on the outskirts of the Mallee country in the Wimmera district, in September, 1882. The nest was built in the upright fork of a *Casuarina* about fifteen feet from the ground, and is similar in every respect to that of *S. chrysoptera* ; hence its description would be merely a repetition of that of the nest of the latter species. Eggs three in number for a sitting, the ground colour darker, and the blotches heavier, than in *S. chrysoptera*, being a deep bluish-white, with long slaty-black markings, while appearing underneath the surface of the shell are large superimposed blotches of dark lilac, which in some instances are confluent ; the markings on the under surface are much larger and more numerous than on the outer surface of the shell. Length (A), 0·66 × 0·51 inch ; (B), 0·66 × 0·53 inch ; (C), 0·67 × 0·54 inch.



*SCYTHROPS NOVÆ HOLLANDIÆ, Lath.*

This bird is universally distributed over the whole Continent of Australia, and one or two stragglers have even been found in Tasmania.

Dr. Hurst has kindly permitted me to describe an egg of this species from his collection, which, he informs me, was taken from the oviduct of a bird shot at Kempsey on the Macleay River, during the first week in November, 1884, and which he exhibited at a Meeting of this Society in the same month.

Ground colour dull white, with faint washed-out pinkish spots and minute dots, also some of a light yellowish-brown tinge; appearing as if beneath the surface of the shell at the apex of the thick end are others of a light purplish-brown, becoming confluent, and forming a very indistinct patch, intermingled with some of a brownish shade. All the markings are very ill-defined, and the egg closely resembles a very large and washed-out specimen of the egg of *Grallina australis*. Length, 1.5 x 1.05 inch.

A nest before me is composed of rushes and wiry grass, bitten into suitable lengths, and bent round and interwoven here and there into a platform of about half an inch in thickness ; a piece of *Lycopodium* also being worked into it. The diameter of the nest is 4·5 inches. Eggs white, and three in number for a sitting, shell smooth. Length (A), 1·03 × 0·85 inch ; (B), 1·01 × 0·85 inch ; (C), 1·06 × 0·85 inch. (*Dobr. Mus. Coll.*).

## NOTES AND EXHIBITS.

Mr. Whitelegge exhibited a number of slides of Polyzoa in illustration of his paper.

Mr. MacDonnell showed the saw of a species of *Pristis* from W Australia, said to have been obtained from fresh-water.

Mr. North exhibited the eggs of the following species of Birds, *Artamus melanops*, Gld., *Strepera intermedia*, Gld., *S. melanoptera*, Gld., *Rhipidura diemenensis*, Sharpe, *Malurus cyaneochlamys*, Sh., *Acanthiza inornata*, Gld., *Poephila acuticauda*, Gld., *Acanthorhynchus dubius*, Gld., *Sitella plicata*, Gld., *Zosterops flavogularis*, Masters, and *Megaloprepia assimilis*, Gld.

Mr. A Sidney Olliff exhibited the insects obtained by Messrs W A. Harper and J. A. Millington, during a short residence in Norfolk Island. He called attention to *Papilio Ilioneus*, Don.

this time *Pleurodictyum* has not been recorded from N.S.W., and the only species recorded from Australia is that mentioned by Prof. McCoy (1); and I am able to support his contention that it occurs in Silurian formations in Australia. The specimen now exhibited has cells over half an inch in diameter, and the whole specimen measures two inches across. The period of time during which *Pleurodictyum* flourished in the Bowning area was relatively a short one, the total thickness of the stratum in which it occurs being only a few feet. I have not seen *P. megastoma*, but I am aware that beds similar to the Bowning beds occur in Victoria; it is, therefore, likely that the specimen under notice may be identical with that species. (b) *Calymene Blumenbachii*: this fossil also makes its appearance towards the close of the series, and the species flourished during a relatively short period, as it is found in a stratum about one foot thick. There appears to have been a remarkably sudden invasion on the part of numerous individuals of this species, followed by as sudden a retreat. Immediately below the stratum from which this specimen was obtained, *Phacops fecundus* (?), the two species of *Acidaspis* referred to above, and a species of *Proetus* are found. On the invasion of *C. Blumenbachii* these species, from some cause not evident except the presence of *C. Blumenbachii*, altogether disappeared. (c) *Supposed Fish-Spines*: these are usually found in pairs and mostly in the same relative position to each other, lying side by side but separated at their bases by distances varying from 3 to 9 lines, and gradually approaching to contact at their apices, which taper to very fine points. They have a slight curve throughout which increases towards the apical points, and their greatest diameter is near the middle. The pair exhibited are four inches in length, and their greatest diameter is one line, but they are incomplete. They are found associated with *Acidaspis Leonhardi* (?), *Acidaspis* sp. (?), *Phacops fecundus* (?), and *P. caudatus*.

---

(1) *Annals and Magazine of Nat. Hist.* 1867, Vol. XX. p. 201, in a footnote as follows:—"It is worthy of remark that, as on the continent of Europe the Devonian genus *Pleurodictyum* has now been found in Silurian strata, so in these beds in Victoria, I find a new species (*P. megastoma*, McCoy) with cells half an inch in diameter."

F.G.S., Government Palæontologist, at Australia. (*f*) *Psilophyton* sp.: the species referred by Mr. Etheridge to this Australia has not before been recorded associated with *Phacops caudatus*, *Leonhardi* (?), and another *Acidaspis*.

Specimens of Crustacea belonging to also exhibited. In concluding, Mr. absence of many important palæontological libraries in this colony, and the consequences of getting fossils identified.

Mr. Macleay exhibited two fine specimens of the very remarkable obtained by the Rev. Tenison-Woods in exhibited the Insects and Snake descriptions

Mr. Trebeck called attention to the the Colonial Secretary of Queensland inability of cultivating the virus of pleuroinoculation, and expressed the hope that attention to the matter. In reply Dr meeting of the Society he would read

Mr. Fletcher exhibited living and spiracles

bacteria, which he had put up in the adjoining Laboratory. He showed cultivations on various gelatinous nutritive substances, in meat broth, and on boiled marine animals (fish, crustaceans). Those on fishes (whiting, bream) especially, offer a most beautiful aspect, and the light emitted by them is very intense. He also demonstrated that ordinary sea-water can be rendered phosphorescent by adding to it cultures of the above micro-organisms. There were three aquaria, two containing between 11 and 12 gallons each, and one 2½ gallons of sea-water. These quantities of sea-water became highly phosphorescent by the addition of mass-cultures of the luminous organisms, so as to resemble what is known under the name of "milky sea."

Mr. Masters exhibited for Mr. Prince a specimen of a very beautiful Wood Moth of an undescribed species of *Pielus* taken at Lawson (Blue Mountains) a short time ago. The Insect is five inches across the wings, the upper wings reddish-brown with bright silver markings, the underwings deeply purple. Dr. Lucas remarked that he had seen a specimen of this Insect from Gippsland, Victoria.

WEDNESDAY, 27<sup>TH</sup> JULY, 1887.

---

The Hon. James Norton, M.L.C., in the Chair.

---

Mr. C. T. Musson was present as a visitor.

---

Mr. W. Kershaw, Melbourne; and the Hon. W. H. Suttor, M.L.C., Bathurst, were elected Members of the Society.

---

The Chairman announced that the next Excursion had been arranged for Saturday, August 13th. Members to meet at the

"Bulletins du Comité Géologique, St. Pétersbourg, 1887." Tome VI., Nos. 4 and 5. *From the Committee.*

"Abstract of Proceedings of the Zoological Society of London," (17th May, 1887). *From the Society.*

"Abhandlungen herausgegeben vom naturwissenschaftlichen Vereine zu Bremen." IX Band, Heft 4 (1887). *From the Society.*

"Zoologischer Anzeiger." X Jahrg. Nos. 252 and 253 (1887). *From the Editor.*

"Feuille des Jeunes Naturalistes." No. 200 (June, 1887). *From the Editor.*

"The Scottish Geographical Magazine." Vol. II., No. 6 (June, 1887). *From the Hon. W. Macleay.*

"Proceedings of the Geographical Society of Australasia, New South Wales and Victorian Branches." 2nd Sess. (April to Dec., 1884), Vol. II. *From the Society.*

"The Victorian Naturalist." Vol. IV., No. 3 (July, 1887); "Seventh Annual Report 1886-7, List of Members," etc. *From the Field Naturalists' Club of Victoria.*

"Revue Coloniale Internationale." Tome IV., Nos. 5 and 6 (May and June, 1887). *From l'Association Coloniale Néerlandaise à Amsterdam.*

"Elements of Pharmacology." By Dr. Oswald Schmiedeberg. Translated by Thomas Dixson, M.B. *From Dr. Dixson.*

"Verhandlungen des Vereins für naturwissenschaftliche Unterhaltung zu Hamburg, 1883-5." Band VI. *From the Society.*

"Bulletin de la Société Impériale des Naturalistes de Moscou." Année 1887, No. 2. *From the Society.*

'Nieuwe Naamlijst van Nederlandsche Schildvleugelige Insecten.' By Dr. Ed. Everts. *From the Dutch Society of Sciences in Haarlem.*



"*Horae Societatis Entomologicae Rossicae.*" Tome XX (1886).  
*From the Society.*

"The Transactions of the Entomological Society of London for the year 1887." Part II. (June). *From the Society.*

"Journal of the Royal Microscopical Society, 1887." Part 3, (June). *From the Society.*

"Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandlinger, 1884-6." *From the Academy.*

"The Australasian Journal of Pharmacy." Vol. II., No. 19 (July, 1887). *From the Editor.*

"The Sydney University Calendar, 1887." *From the University.*

"Natuurkundig Tijdschrift voor Nederlandsch-Indië." Deel XLVI, (1887). *From the Kon. Natuurkundige Vereeniging in Ned.-Indië.*

PAPERS READ.

REPORT ON A SMALL COLLECTION OF PLANTS FROM  
THE AIRD-RIVER, OBTAINED BY MR. THEODORE  
BEVAN DURING HIS RECENT EXPEDITION ;

SUBMITTED BY BARON VON MUELLER, K.C.M.G., M.D., PH.D.,  
F.R.S., &c.

(Plates VI and VII.)

Among the plants entrusted to the writer's examination, two prove new to science, and of these two now the descriptions are offered. Besides species of the following genera occur in the collection :—*Myristica*, *Pittosporum*, *Quercus*, *Mucuna*, *Manilloa*, *Voacanga* (*Orchipeda*), *Dischidia*, *Fagraea*, *Selaginella*, *Trichomanes*, *Davalia*, *Asplenium*, *Aspidium*, *Polypodium*.

The *Manilloa* is the *M. grandiflora* of Scheffer. Mr. Bevan remarks, that it attains about 15 feet in height, that the stem is bare, that the colour of the floral leaves is salmon-pink, and that they bend downwards in bell-shaped masses.

MUSSAENDA BEVANI.

(Plate VI.)

Branchlets glabrous ; leaves nearly orbicular, only along their costate nerves hairy ; racemes few-flowered, almost corymbose ; peduncles, bracts, pedicels and calyces rather densely beset with appressed brownish hairlets ; lobes of the calyx often isomorphous, during anthesis longer than the tube, deltoid-semilanceolar, acuminate, early deciduous, the fifth calyx-lobe (if changed) extremely large, conspicuously stalked, pale, ovate-orbicular, almost glabrous ;

corolla many times longer than the calyx, rather densely short-hairy outside, its lobes narrowly semi-lanceolar, hardly half as long as the throughout slender tube, inside minutely papillular-hairy; stamens reaching nearly to the summit of the corolla-tube; filaments extremely short; anthers linear, pointed, almost half as long as the tube of the corolla, narrowly but conspicuously bilobed at the base; stigmas setaceous-linear, thrice shorter than the style, ovary short.

Near the Aird-River (Theodore Bevan, Esq.).

The small branchlet obtained bears only one leaf, which evidently is diminutive, so that the rounded form may not be normal; the inflorescence may also, perhaps, become more elongated, than shown by our material.

The broader calyx-lobes but narrower corolla-lobes, further the shorter filaments, the longer anthers and the extremely narrower stigmata distinguish this new Papuan species already from all forms of *Mussaenda frondosa*, the only congenet hitherto recorded from New Guinea. The form of the leaves (as far as known) the

petioles densely beset with lax spreading compressed hair; cyme dichotomously branched, many-flowered, glabrous; bracteoles comparatively large, quite petaloid, roundish, situated closely under the calyx, entire, deciduous, as well as the calyx-lobes and petals rosy-red; lobes of the calyx petaloid, renate-orbicular; petals of the staminate flowers two, of the pistillate flowers one; lanceolate- or ovate-elliptical; stamens rather numerous (25-30), anthers roundish with cuneate base; filaments connate only near their base; styles three, very short, almost free; lobes of the stigmas much twisted; fruit three-celled; membranes from two of its angles almost dimidiate-orbicular, the membrane from the third angle nearly as broad as its own length, almost truncate at the summit, but thence outward not acutely protracted, all three appendages somewhat rigid, extending at both ends beyond the fruit-cells, but only slightly decurrent; placental plates two in each cavity of the fruit; seeds very minute, almost ovate, pale-brownish, somewhat furrowed.

In the vicinity of the Aird-River (Theodore Bevan, Esq.).

This handsome plant, which should readily enter into horticulture, has been chosen to perpetuate in the vegetation of the great Papuan Island also the memory of the Rev. Mr. Sharpe, who recently succumbed as a martyr of Christianity, while carrying the gospel to the wild regions of New Guinea.

*Begonia Sharpeana* agrees with *B. sinuata* to some extent in the form of its leaves, in its inflorescence, in the size of its flowers and in the form of its anthers; but the petioles are not glabrous, the leaves are larger and far more inequilateral, the petals of the fruit-bearing flowers seem always reduced to one, the styles are three in number and so the fruit cells, the appendages of the fruit are much more unequal, reach beyond the cavities and are angular at the summit; besides all this the occurrence of a pair of broad petaloid bracteoles under the flowers is quite unusual in the genus *Begonia*. This new species should systematically be placed in the section *Knesebeckia* near *B. scutata*. The characteristics of the stem and root remain as yet unknown, so the stipules and the

manner of fruit-dehiscence; the dried leaves are tender-membranous and not much paler beneath.

This seems an apt opportunity to record some other plants, previously unknown from New Guinea, though not obtained through Mr. Bevan's Expedition:—*Triumfetta rhomboidea*, N. Jacquin; *Tristania suaveolens*, Smith; *Notolixos rubraurea*, Oliver; *Panax fruticosum*, Linné fil.; *Alsomitra Muellieri*, Cogniaux; *Scaevola oppositifolia*, Miquel; *Ipomoea chrysoides*, Ker.; *Eria Kingii*, F. v. M.; *Cyperus digitatus*, Roxburgh; *Monogramma dareocarpa*, Hooker; *Lepidozia Wallichiana*, Gottsche; *Phragmicoma Novo-Guineensis*, Stephani; *Marasmius crinis-equ*, F. v. M.

---

#### EXPLANATION OF PLATES.

(PLATE VI.)

MUSSAENDA BEVANI.




## GENERAL REMARKS ON PROTECTIVE INOCULATION FOR BOVINE PLEURO-PNEUMONIA.

BY DR. OSCAR KATZ.

Having been requested by a Member of this Society at its last meeting to turn my attention to the movement that is going on in Queensland, and I may add, to no less extent in this country, as to the subject of protective inoculation for bovine pleuro-pneumonia at large, and a satisfactory and practical *modus* of such a procedure in particular, I have tried to put together in the following lines a concise general review of what may be gathered and followed from our knowledge about the subject in its present state.

Touching the history of the practice of inoculating cattle as a preventive treatment against lung-plague, or, as it is more commonly called, pleuro-pneumonia, I may mention that it was first introduced by Dr. Willems, of Hasselt (Belgium), as far back as 1852. To my knowledge it represents the first case in which a kind of vaccination was on a large scale applied to animals. Since that time an almost universal attention has been and is still directed to this specific prophylactic; there is, in fact, every reason for attempting to suppress and to get rid of this plague which at the present day is met with more or less in every part of the globe, and has involved and continues to involve most serious pecuniary losses. For instance, since the supposed introduction of the disease into Australia in 1858, the damage caused by its devastation and by the measures employed for mastering it, amounts to something enormous. Queensland alone which possesses about four million



head of cattle, that is nearly as much as the other Australian colonies together, is estimated to have participated therein to the extent of £5,000,000, and the annual losses entailed are calculated to be about £500,000.

In looking at the position which protective inoculation for this cattle disease occupies at present in those countries where the latter is prevalent, and the rearing and preservation of stock a matter of vital importance, we find that most of them are in favour of this treatment being adopted. These are principally : Scotland, Belgium, The Netherlands, France, South Africa, and last but not least, the Colonies of Australasia. I may be permitted to quote some figures. As the result of an official inquiry in 1875, into the state of preventive inoculation for pleuro-pneumonia in New South Wales, it turned out, that a strong majority of graziers pronounced a favourable verdict. Of 282 cattle-owners who were in the habit of inoculating, 234 were favourable, 19 opposed to the measure, *i.e.*,

is altogether objectionable from a practical standpoint as well as from an economical one, and that consequently, all therapeutics have to be thrown overboard. Nothing then remains but the employment of prophylactic measures, of which protective inoculation is one. We have now to enter upon a consideration of the nature of this subject, and to see whether the results of such a consideration can be brought into harmony with the seemingly favourable results claimed by the advocates of the system.

The notion "protective inoculation" in connection with any disease, hence also in the cattle disease under notice, presupposes that it belongs to the group of infectious diseases which by means of a "contagium," are capable of transmission from individual to individual, at least under certain circumstances. That bovine pleuro-pneumonia is one of this kind, or in other words, that it presupposes a contagium in the shape of an organised something, of a microscopic being, is regarded as a settled question, to judge from the present standpoint of science, and from practical experience. For a full understanding of the disorder, as well as for the mode of combating it (taking special reference to protective measures), it must, however, appear very important to know at the very outset, how the disease spreads. There are two principal possibilities. (1) It may be caused by germs which represent so-called *obligate* parasites, that is to say, which for their propagation need the body of cattle (or perhaps of some other animals). These germs again might be of two descriptions. On the one hand they might lose their power of infecting by having been exposed to external agencies, thus resembling, as it were, the pathogenic factors in human syphilis, in regard to which we are compelled to accept the view that it cannot be communicated but by immediate contact. On the other hand they might also, after having left the animal body, but if so without being able to propagate, possess the faculty of infection. An instance of such a kind we have in



tuberculosis, the microbes of which represent the vehicles of both direct and indirect infection, the latter taking place by germs (their spores) which exist in our surroundings, and hold out there for a considerable length of time. (2) The disease, as such, might be attributed to so-called *facultative* parasites, i.e., micro-organisms which feed, multiply, and may form resting stages on or in various dead organic substances, but transferred to the living animal body manifest themselves as parasites. The best known instance of such a case is furnished by *anthrax* or *splenic fever*. The pathogenic agents of this infectious disease, the *anthrax* bacilli, are not necessarily bound to live in animals or in man, on the contrary they are originally harmless saprophytes, but, when occasionally gaining access to the blood-system of living beings, they unfold a most pernicious activity.

It is evident that a decision of which of the above conditions is fulfilled with regard to bovine pleuro-pneumonia, must have a legitimate bearing on the question of the kind of protective means

for a final decision, since opinions differ widely as to that point. Yet we are warranted in saying *a priori* that, in a similar way as it has been pronounced by von Pettenkofer for epidemic cholera, the outbreak of an epidemic of pleuro-pneumonia must have been preceded by an infection *en masse*. Infection of this description could best be brought about by micro-organisms of the type of *facultative* parasites (see above). In epidemics of anthrax and of typhoid fever we cannot but trace such a course of things ; besides, the statistic observations on the mode of spreading of cholera, anthrax, and typhoid-fever, are altogether in concordance with the results of laboratory experiments on the infectious matter of these diseases. On pleuro-pneumonia we fail to bring to bear such powerful help ; for it is premature in this direction to draw definite conclusions from the results of investigations by Poels and Nolen, who have designated a certain micrococcus as the *vera causa* of that bovine disease (*The Veterinarian*, March 1887, pp. 143-157). In the interest of the matter itself their experiments require expansion, and the results as yet obtained corroboration.

Returning after this digression to our subject proper we must try to obtain a definite view of its essential characters.

In its present shape protective inoculation for bovine pleuro-pneumonia occupies a peculiar position among the other modern inoculations or vaccinations. It is a matter *sui generis*. The procedure is as follows : when the disease is stated to be present in a herd, the *vaccin* is procured by killing one or more of the sick individuals, and collecting the *serum* out of the diseased lungs, or the pleural exudations. A definite portion of such liquids is then transferred—the *modus operandi* differs—to the subcutaneous connective tissue near the end of the tails of healthy, or we have reason to add, apparently healthy individuals. This operation gives rise to a localised swelling which is considered to be a repetition in a milder form of what takes place in lungs and pleuræ in the

virulent form of the disease. After this local affection is over, the animals are said to be proof against lung-plague.

From this generalising report on the mode in which protective inoculation for the cattle-disease under treatment is being practised, you will at once perceive its peculiarities. Take as object of comparison the ideal of the modern preventive inoculations, vaccination against variola. Vaccination in the human species is admittedly followed by the intended result only when it is carried out before the disease (variola, small-pox) has taken possession of the individuals that are to be protected. It is a genuine preventive treatment which will not admit of the incursion of the disease. The same principle is adhered to in the preventive inoculations for certain animal plagues, for anthrax or splenic fever in sheep and cattle, for symptomatic anthrax (or "black-leg" or "quarter-ill") in cattle, for fowl-cholera, and swine-fever. In all these cases the employment of the preventive precedes, must precede the appear-

subject to considerable fluctuations, thus rendering the question of making a correct diagnosis a matter of considerable embarrassment. In view of such facts, the above factor in connection with inoculation for "pleuro" is pre-eminent; it must be looked upon as a very strong objection to the measure in its present state, unless experiments can show beyond every doubt that immunity through inoculation is also bestowed upon such animals as are already infected. Otherwise the manipulation, instead of preventing the disease from spreading, would tend to preserve and propagate it, by allowing vaccinated but previously affected individuals to pass as being safe. It is true that in the most modern protective inoculation, namely Pasteur's treatment of hydrophobia, we find an instance which seems to correspond to a postulate of the above kind. Pasteur applies his method not until his patients have been bitten by a rabid animal, and, consequently are already impregnated with the deadly virus. For the present, however, it is advisable to view with some reserve Pasteur's results so far as rabies is concerned.

Another point that calls for our attention is this. How is it that in pleuro-pneumonia the material to be inoculated has the shape of a virus, taken directly from the diseased organs, and in this condition applied to the subcutaneous cellular tissue of the tail, that is to say, to spots which have nothing to do with the chief seats of the malady? With one exception (see below), there is no analogy to this extraordinary case in the other protective inoculations which have been made known. Here *vaccins* are used which although morphologically very similar to, or, as a rule, quite the same as the virulent agents, are weakened, partly naturally, partly artificially, to such a degree that they are no longer able to kill the individual species for which they are intended. The vaccine-lymph for small-pox vaccination represents the virulent material of vaccine or cow-pox, but such a material or, if you like, bacterial life and its products, although extraordinarily alike to

430 PROTECTIVE INOCULATION FOR BOVINE PLEURO-PNEUMONIA,

that of variola or small-pox, cause, when transferred to man, only slight alterations, after which any attack of the virulent factors of this disease will be frustrated. With regard to protective inoculations of animals we may take as example that of anthrax. Here the generally used cultures of micro-organisms are attenuated by means of higher temperatures, so as to have lost their power of infecting, while at the same time their morphological characters do not differ from those of the virulent bacilli. Experience has further shown that the inoculation-material prepared in the described manner, must enter into a communication with those organs or tissues which are the principal seat of the disease present, and in which they have to call into existence symptoms, analogous to those exhibited in the virulent form of the disease, but only modified and often scarcely perceptible. The attenuated anthrax-virus is transmitted through the subcutaneous connective tissue to the blood, which is the seat of splenic fever.

Nothing similar seems to take place with reference to protective inoculations for pleuro-pneumonia. In this case, but a the

symptomatic anthrax we have a well-studied disease, the etiology of which is perfectly known. Not so in bovine pleuro-pneumonia. For this reason we have to be careful not to generalise without further information, and it must rest with future researches to decide upon this hitherto dark question in the mode of inoculation against pleuro-pneumonia.

Even if, for the sake of argument, we admit that inoculation against pleuro-pneumonia in the customary shape does protect, we are not yet thoroughly informed as to how long the protection will last. This is, of course, an important factor, which must necessarily influence the discussion of the whole question. Human vaccination is known to bestow a long-continuing immunity, and re-vaccination is held to be a powerful aid in securing the intended effect. The question of the period of immunity after inoculation against animal-plagues, is as far as we know, more uncertain than in the case of human vaccination. For instance, the protective power of anthrax-inoculation in sheep extends to about one year, while for cattle the period of protection is as yet uncertain. Such an uncertainty has, among other things, rendered the last-mentioned kind of inoculation, and others objectionable, and it is, therefore, not to be wondered at, if the present practice of inoculation against "pleuro" is for the same reason judged in a similar manner.

In addition to the above statements I must point out in a few words that opinions do not agree as to whether inoculated animals are able to infect uninoculated ones or not. This point, of course, is one of paramount importance, and if it could be unmistakably proved that the inoculation in its present shape can yield the means of infection to unprotected individuals, the whole procedure must appear in a most doubtful light. Now, what might happen if a herd of fresh-inoculated cattle, travelling from one end of the Australian Continent to the other, came on their road in contact with other herds that were not inoculated? Well, they would no doubt give a fair chance to these to contract pleuro-pneumonia, which had not existed there before, and the

latter herds, in their turn, or at least the vaccinated members of the same, would repeat the same play.

It might seem as if I am somewhat exaggerating, by reporting things which are not yet actually demonstrated ; but I only state here what we want to know with certainty ; and the importance of the whole question of protective treatment requires us to take an unprejudiced view of it. When the Netherlands Government introduced inoculation for the disease, they ordered the inoculated cattle to be isolated for some time, thus preventing their mixing so soon with others not inoculated ; everybody admits that this was a wise act, and people at that time knew about protection against pleuro-pneumonia not much less than they do now-a-days. Whether the scheme adopted by the Netherlands, could with advantage be imitated by Australia, I cannot tell.

Finally it is an acknowledged fact that, when the plague has appeared in a herd, and inoculation has to be resorted to, owners often experience difficulties in finding the proper vaccin, in preserving it for some time, or in lacking the manual skill required

and encourage protective inoculation for pleuro-pneumonia ; while on the other side, by analysing its proper nature, we cannot admit of its being free from objections. These are partly, as has been shown in the foregoing lines, of a serious character, and thus by no means compatible with the verdict given by that majority. But I repeat distinctly that the objections raised relate to the protective arrangement such as it is found to exist at present. One thing is clear. The prophylactic measures employed in one country against the invasion of animal-plagues need not necessarily be the same in others, and what may be the case with the treatment of bovine pleuro-pneumonia in one part of the earth, need not hold good for that adopted in another one. Countries in which the disease is little prevalent, the relative number of cattle inconsiderable or at least where large herds do not exist, and where, I may add, the means of communication, as for instance railway traffic, are well-developed, may reasonably arrest the spread of the disorder by the "stamping-out system," and subsequent sanitary measures. But to adopt this system in Australia would be absurd, nor could or would its most tenacious defender recommend its being applied here, as things now are. It has been tried in Australia, with what success you may perceive by looking at the prevalence of the plague for the last years. If at present such a system was adopted here, which means not only the destruction of the infected individuals, but also a wholesale slaughter of all those which have been exposed to these, it would be equivalent to the loss of half the present stock of cattle.

Even then the measure would turn out to be utterly futile, unless the whole of the Continent acted in a uniform manner, and then again there will be no full guarantee of success until the origin and spread of the disease is traced beyond every doubt. At all events the colony of Queensland has done well by admitting that a reform in the way of protective means against lung-plague of cattle is absolutely necessary, and it is also easily understood that, as a preventive treatment by means of a *rational* inoculation seems to promise good results, the principal attention has been directed to this point.



The whole question, then, amounts to this. The necessary steps will have to be taken for a thorough investigation of the subject, in order to place it on a more scientific basis. What has already been done in this direction is scarcely more than a mere beginning, and a great many more experiments will have to be made, until we are entitled to say the etiology of the disease is as clearly known as, for instance, that of *anthrax*, and the question of protective inoculation against the disease regarded as solved. The present movement here and in Queensland evidences that these countries have come to the conviction that they will have to go and follow up their own way, instead of waiting till other countries are pleased to lay the desired remedy before them.

## ON SOME NEW TRILOBITES FROM BOWNING, N.S.W.

By JOHN MITCHELL.

*BRONTEUS LONGISPINIFEX*, n. sp.

(Plate xvi. figs. 1 and 2.)

Head-shield semicircular as far as can be judged from the specimens obtained, much granulated, the granulations of varying sizes.

Glabella greatly dilated in front, axial and neck furrows distinct, the front lateral groove feeble, second one strongly marked, facial suture from the eye lobe to the outer margin about parallel with a line drawn longitudinally through the centre of the shield. No spine visible on the genal angle, but from the character of the pleuræ it is probable that it may bear one. The greatest transverse measurement of the glabella about equal to the length of the head. The eye is slightly pedunculated. Length of head-shield one and a-third times ( $\frac{4}{3}$ ) that of the pygidium.

The thorax is the most remarkable feature of this species, the axis being very wide, moderately distinct and slightly arched; axial furrows visible and intensified by an increase of thickness at the base of each segment, and an opposing tubercle at the base of each pleura; the segments have a decided curve forward; width at the fifth segment  $\cdot 1354$  inch ( $\frac{13}{100}$  in.), and this is probably the greatest width. From the sixth the width gradually diminishes, and the last is only about half the width of the fifth and sixth segments. The side lobes are very narrow, the pleuræ being only about one-quarter as long as the axis is wide at its fifth and sixth segments. From each pleura projects a flat spine more than three times its own length; these curve backwards more and more until the last three are parallel or nearly so with the axis; along

the centre of each is a row of fine punctations not visible to the unaided eye. The granulation of the thorax is not nearly so marked as that of the buckler and pygidium; but each pleura bears two conspicuous granules, one on each extremity, the one on the basal extremity helping as before stated to make the axial grooves more marked.

The pygidium is shorter than the cephalic shield, much granulated, and sub-semicircular; that is, if it be transversely sected so as just to remove the part bearing the rudimentary axis, the remainder forms a semicircle. Along the margin are several (6 are visible with a lens) concentric, or nearly concentric striae, similar in character to those on the pygidium of *B. Partschii*, Barr. The ribs are thirteen in number, separated from each other by well-defined sutures. The medial rib is a little wider than the united width of the three adjoining ones on either side of it at their junction with the rudimentary axis, and about as wide as the other three together. The second from the medial rib is very narrow. The length of the medial rib equals about  $\frac{1}{2}$ ths that

the four anterior and missing segments of my specimen would have a length equal to the six that are present, which would make the axis twice as long as wide. Pleuræ long  $\frac{3}{10}$ ths in. (.781 mm.). Length of spine  $\frac{10}{100}$ ths in. (2.6 mm.). Pygidium long  $\frac{11}{100}$ ths in. (2.86 mm. nearly), wide  $\frac{14}{100}$ ths in. (3.6 mm.). Rudimentary axis wide  $\frac{5}{100}$  (about) or  $\frac{1}{3}$  the total width of pygidium. Total length of specimen  $\frac{49}{100}$ ths in. (12.4 mm. nearly).

The subrudimentary character of the pleuræ of the thorax, their long spines, and the great proportionate width of the axis are the striking features of this species, and distinguish it from all I am acquainted with, and certainly from either of those yet recorded from Australia. The specimen here described, which is of immature growth, has six segments of the thorax with pygidium attached nearly perfect. The four front segments have been obliterated by the head which has been turned backwards upon them. Some heads which I have obtained have double the dimensions of this specimen, and would therefore belong to individuals more than 1 inch long.

The test of the thorax and pygidium of this species must have been of a delicate character, for though heads are numerous, it is rare to obtain even a fragment of these two parts.

This fossil occurs in the lower Trilobite Bed of the Bowning Series, associated with representatives of the genera *Acidaspis*, *Encrinurus*, *Proetus*, *Cromus*, *Harpes*, &c. Two of the associated species have been identified by F. Ratte, Esq., as *Acidaspis Verneuili* (?), and *Proetus Ascanius* (?), vide Proc. Linn. Soc. of N.S.W. 1886, pp. 1066-7. (1)

*Locality*.—Bowning. From a specimen in my collection.

---

(1) When I submitted the fragments of *A. Verneuili*, which are here described by Mr. Ratte, I had not obtained a pygidium that beyond doubt belonged to the same species as the head and fragment of thorax here referred to; but since then I have obtained several pygidia attached to fragments of the thorax of this species; and they agree in character with the description given of the pygidium of *A. Verneuili* by Barrande. Hence the doubt which Mr. Ratte had on account of the absence of a pygidium, must I think, be set at rest; and Mr. Ratte's identification of *A. Verneuili* for the species, be confirmed.

*CYPHASPIS BOWNINGENSIS*, n. sp.

(Plate xvi. fig. 3.)

The specimen here described is nearly complete, and was obtained by me from the upper Trilobite Bed of the Bowning group.

Head shield apparently semicircular, though as the specimen is slightly contorted, and one of the free cheeks is absent, that is not certain.

The glabella is pyriform, very convex, circumscribed lobe small, axial furrow distinct and deep in front; anterior portion of the facial suture directed outwards at an angle of about  $30^\circ$ , the posterior portion cuts the side lobes in about the middle. The eye is crescentic. The genal angles terminate in spines about  $\frac{1}{2}$  in. long (1.6 mm. nearly); limb strongly curved downwards in front, and the edge upwards.

The thorax is about as wide as long, the axis very prominent, with 11 or 12 segments: its greatest width  $\frac{3}{4}$  in. (1.6 mm. nearly)

## PROETUS BOWNINGENSIS, n. sp.

(Plate xvi. figs. 4-6.)

Head evidently semicircular. Glabella large, semi-conoid and not distinctly marked off by the axial grooves, the lateral furrows feebly present, neck furrow shallow and wide, width between the eye lobes nearly equal to the length of glabella, fixed cheeks rudimentary, facial suture rather straight cutting the outer margin nearly at right angles, and the posterior margin rather near to the glabella. The glabella and tail are about equal in length. Eye crescentic. Of the thorax I have only distinguished fragments. In these the sulcus is strongly marked, and terminates short of the extremity.

Pygidium semi-elliptical, about  $\frac{3}{4}$  as long as wide, the axis very conspicuous, sides rather perpendicular, top arched or convex, with 7 or 8 rings visible, those towards the extremity indistinct. The 8 rings are only seen in the largest specimens. Side lobes  $1\frac{1}{2}$  times as wide as axis at widest part; they are fairly convex on some pygidia, and in others rather flattened (but I think that the convex is the normal character), margin fairly large. Four pleuræ of the pygidium strongly indicated in which the sulcus is wide and shallow.

I give some of the dimensions of one of the specimens figured (fig. 4), which is fairly complete; but unfortunately it has the head turned back on the thorax and almost covering that part.

Glabella long  $\frac{24}{100}$  in. (6.35 mm.); pygidium long  $\frac{24}{100}$  in. (6.35 mm.), wide  $\frac{30}{100}$  in. (9.5 mm.). Another pygidium (fig. 5) has a length of  $\frac{30}{100}$  in., and width of  $\frac{40}{100}$ , so that the proportion of length to width is variable, arising probably from different degrees of compression suffered by the different specimens.

This species is obtained from the lower Trilobite Bed of Bowning, associated with several species of *Phacops*, *Acidaspis*, and a *Cyphaspis*, probably identical with the one described above. One of the first-named is either *P. longicaudatus* or very closely allied to it.

*Note.*—Since writing the above description I have examined a larger pygidium of the *Bronteus*, and find that the second rib from

the medial one is not narrower than the adjoining rib. The compressed state, therefore, of this rib in the specimen described, may be only characteristic of young specimens.

In conclusion I have to express my obligations and thanks to Mr. R. Etheridge, F.G.S., who has kindly helped me with suggestions and advice.

---

#### EXPLANATION OF PLATE.

- Fig. 1 — *Brontops longispinifer* — Pygidium and 6 segments of thorax ( $\times 3$ ).  
 Fig. 2. — „ „ Head and one free cheek. (Nat. size).  
 Fig. 3. — *Cyphaspis Bowringensis* ( $\times 2$ ).  
 Fig. 4. — *Proetus Bowringensis* — Pygidium and head, the latter turned back on the thorax. (Nat. size.)  
 Figs. 5 & 6 — *Proetus Bowringensis* — Another head and pygidium. (Nat. size.)

CONTRIBUTIONS TO THE OOLOGY OF THE AUSTRO-  
MALAYAN AND PACIFIC REGIONS.

By A. J. NORTH.

Under this heading I purpose to describe the eggs of such species from the above-named regions, as I may consider of sufficient interest to Oologists; such will necessarily be from various sources, and in the present instances I am indebted to the courtesy of the Trustees of the Australian Museum, the Hon. Wm. Macleay, and Messrs. Ramsay Bros. of Dobroyde, for access to their collections.

STRIX LULU, *Peel.*

This egg was obtained by Mr. Boyd at Ovalau; it is similar in form to that of the Australian species, *S. delicatula*, pure white, shell slightly rough. Length,  $1.53 \times 1.22$  inch.

MACROPTERYX MYSTACEA, *Less.*

A single egg of this species taken at New Britain by Mr. Parkinson, is oval in form, pure white, shell smooth, but without any gloss; long axis 1.3 inch, short axis 0.83 inch. The parent birds were also procured.

MEROPS ORNATUS, *Lath.*

Specimens of this bird together with the eggs procured at New Britain by Mr. Parkinson, are similar to the Australian forms, differing only in their smaller admeasurements. Eggs rounded, white and glossy. An average egg measures—long axis 0.85 inch; short axis 0.77 inch.

HALCYON SACRA, *Gmel.*

This bird was found by Mr. J. A. Boyd, breeding freely at Ovalau, tunnelling in the nests of the white ants. Eggs five in number for a sitting, globular in form, pure white, the texture of



are from three to four in number for a sitting, varying in form from swollen to elongated ovals, of a greenish-white, minutely spotted, and heavily blotched with light purplish-red markings, chiefly towards the larger end; one specimen (A), has only a few indistinct spots on the larger end. Length (A),  $0.97 \times 0.77$  inch; (B),  $1.09 \times 0.76$  inch, (C),  $1.09 \times 0.73$  inch.

From the Duke of York Island.

*PHILEMON COCKERELLI, Sclat.*

A very handsome set of eggs procured, together with the birds, by Mr. Parkinson at New Britain, are in form pointed ovals, of a deep reddish salmon colour, heavily blotched all over with irregularly shaped markings of a darker tint, but more particularly towards the larger end, intermingled with others of a light purplish-grey, which appear as if beneath the surface of the shell. Length (A),  $1.31 \times 0.93$  inch; (B),  $1.38 \times 0.93$  inch; (C),  $1.34 \times 0.94$  inch.

*CINNYRIS CORINNA, Salvad.*

A nest of this species taken at New Britain, is a dome-shaped

**ECLECTUS POLYCHLORUS, Scop.**

An egg of this species in the Australian Museum Collection, taken by Mr. Goldie in New Guinea, on the 26th of April, 1880, is pure white, rather pointed at the end, the shell being slightly rough, and without any gloss. Length 1·7 inch  $\times$  1·7 inch in breadth.

**CARPOPHAGA LATRANS, Peel.**

Eggs of this species taken by Mr. Boyd at Ovalau, are oval in form swelling gradually towards the centre, pure white, shell smooth without any gloss. Long diameter 1·77 inch; short diameter 1·28 inch.

**CHRYSOENA LUTEOVIRENS, Homb. et Jacq.**

Eggs two in number for a sitting, white, elongated in form. Length (A), 1·26  $\times$  0·85 inch; (B), 1·32  $\times$  0·83 inch. Taken at Ovalau by Mr. Boyd.

**PTILOPUS MARIE, Gray.**

Two eggs of this species taken at Ovalau by Mr. Boyd, are in form elongated ovals, pure white. Length (A), 1·26  $\times$  0·86 inch; (B), 1·15  $\times$  0·81 inch.

**DEMIEGRETТА SACRA, Gmel.**

Eggs of this species are of a uniform pale greenish-white. Length 1·95  $\times$  1·3 inch. Taken by Mr. Boyd at Ovalau on the 1st of September, 1879.

**ARDEA JAVANICA, Horsf.**

An egg of this bird taken at Ovalau, is oval in form, of a pale bluish-green. Length 1·45  $\times$  1·05 inch.

**PHLEGOENAS STAIRI, Gray.**

This species, which feeds so largely upon chilies that its flesh is scarcely palatable, lays one egg only, pure white, elongated in form. Length 1·22  $\times$  0·9 inch. Taken at Ovalau, November 11th, 1879.

*JAKTHENAS VITIENSIS*, Quoy et Gaim.

Eggs of this species taken by Mr. J. A. Boyd at Ovalau, are pure white, in form of a lengthened oval, the texture of the shell being fine, and the surface slightly glossy. Long diameter 1·6 inch ; short diameter 1·15 inch.

*AMAUBORNIS MOLUCCANA*, Wallace.

A set of the eggs of this species, taken by Mr. Parkinson while at New Britain, are oval in form, of a dull white thickly spotted with small irregularly-shaped reddish-chestnut markings, intermingled with others of a deep bluish-grey appearing as if beneath the surface of the shell, which predominate chiefly towards the larger end. Length (A), 1·57 × 1·15 inch ; (B), 1·64 × 1·15 inch ; (C), 1·6 × 1·17 inch ; (D), 1·67 × 1·14 inch ; (E), 1·65 × 1·16 inch.

Specimens of the birds were also procured at the time of taking the eggs.

*GALLINULA RUFICRISTA*, Gould.

A single egg of this species in the Dobroyde Collection, is of a

NOTES ON A SPECIES OF RAT (*MUS TOMPSONII*,  
RAMSAY), NOW INFESTING THE WESTERN POR-  
TION OF N.S.W.

By K. H. BENNETT.

These rats made their appearance in the Ivanhoe district in February of the present year, but at that time only as scattered individuals. By the middle of April the whole country west of the main road from Booligal to Wilcannia was swarming with them, all travelling in a southerly direction; and so numerous were they that on loose sandy spots, and along dry dusty roads (trending south), the tracks of horses, sheep, and vehicles were nightly as completely obliterated by the foot-prints of the passing swarms, as if the surface of the soil had been swept with a broom. On one occasion at an out-station on Kilfera Run, a large number of sheep had been put through a gate near the house on the afternoon of my arrival, and of course thousands of tracks or foot-prints of sheep were visible on the dry dusty soil through and around the gate; but the next morning not a track was to be seen, and the whole ground was as smooth as if swept by a broom or a strong wind, although the night was perfectly calm. A close inspection, however, soon revealed the cause which was entirely owing to the swarms of rats that had passed during the night, millions of tiny foot-prints completely smoothing the dusty soil. These journeys were always performed during the night, the rats hiding in the day time in rabbit-warrens, deep fissures in the ground, or amongst dense masses of herbage. Their food consists chiefly of seeds of various kinds, and the soft succulent stems of a plant locally known as "pigweed," which owing to the good season is extremely plentiful; but I am inclined to think that their diet is not exclusively confined to vegetable substances, as I have been

informed by several rabbiters that they devour the young rabbits caught in their traps. For this reason and from the fact that in many places more rats than rabbits are caught in the traps—although the latter animals are numerous—they are held in detestation by the rabbiters. When I left the Ivanhoe district about the middle of May, the main body had passed on in a southerly direction, but numerous stragglers still remained. On my arrival here (Tilpa, Middle Darling) towards the end of that month, I found them tolerably numerous along the river, and for some short distance out, but in the back country towards Cobar they seem to be almost unknown. Within the last few days (July 12th) I have returned from a trip in that direction, and I find that they have become much more numerous along the river, and spread further out. Whether this is another invasion taking a more easterly direction than the preceding one, I am unable to say. I notice here that, in addition to living in deep fissures, masses of herbage, &c., they have constructed numerous burrows as if they intended to remain for some time, and they have already

to making numerous burrows like the present animal, they also constructed large heaps of sticks, the rotting remains of which are after so many years still observable. Beneath these heaps they made large nests of soft dried grasses, the nests being placed in a shallow central hollow on the surface of the ground which was reached by burrows or tunnels from the outside beneath the pile of sticks. This invasion was accompanied by hundreds of hawks (*Elanus scriptus*), and various species of owls, which preyed on the rats. On this occasion neither hawks or owls have accompanied them.

In 1874 whilst on an exploring trip in search of sheep country in the Barrier Ranges, I come across numbers of these heaps tenanted by rats, and on setting fire to them as many as a dozen rats would run out, but as I did not take much notice of them I am unable to say whether they were identical with the present species or not. The hawks (*E. scriptus*) and owls were there in great numbers.

Mr. A. Sidney Olliff exhibited a specimen of *Epidemia tricolor*, Westw., a rare moth which he had recently captured at Double Bay. On several occasions specimens of this moth have been taken in Mr. Macleay's garden, at Elizabeth Bay, but Mr. Olliff said that he believed it had not been seen for some years past.

Mr. Whitelegge exhibited a beautiful preparation of *Tubularia gracilis*, R. v. L., showing the polyps fully expanded; and specimens of the stalked larvæ of an undetermined species of *Comatula* from Port Jackson.

WEDNESDAY, 31<sup>ST</sup> AUGUST, 1887.

---

The President, Professor Stephens, M.A., F.G.S., in the Chair.

---

A letter was read from the Secretary of the Royal Society of Adelaide, expressing regret that the proposal to have Special Meetings and Excursions in Adelaide during this month (see our Abstract for 29th June) had been abandoned. Members of this Society able to visit Adelaide will nevertheless be cordially welcomed, and efforts will be made to make the ordinary Meetings and Excursions especially interesting.

---

The President announced that two Excursions had been arranged for the ensuing month :—

- (1.) September 10th—Members to meet at the Redfern Railway Station, to proceed by the 8.15 a.m. train to the watering-station beyond Berowra, Hawkesbury Line.
  - (2.) September 24th—Members to meet at the Redfern Railway Station, to proceed by the 9 a.m. train to St. Mary's.
- 

#### DONATIONS.

“Bulletin of the American Geographical Society, 1886.” Nos. 4 and 5 ; Vol. XIX., No. 2 (1887). *From the Society.*

“Bulletin of the Museum of Comparative Zoology at Harvard College.” Vol. XIII., No. 4 (1887). *From the Curator.*

“Comptes Rendus des Séances de l'Académie des Sciences, Paris.” Tome CIV., Nos. 18-23 (1887) ; “Tables des Comptes,” etc., Second Semestre, 1886. Tome CIII. *From the Academy.*



"Bulletin de la Société Royale de Géographie d'Anvers." Tome XI., 4e Fascicule (1887). *From the Society.*

"The Scottish Geographical Magazine." Vol. III., No. 7 (July, 1887). *From the Hon. W. Macleay.*

"Some New South Wales Tan-Substances." Part I. By J. H. Maiden, F.R.G.S. *From the Author.*

"The Australasian Journal of Pharmacy." Vol. II., No. 20 (August, 1887). *From the Editor.*

"The Journal of Comparative Medicine and Surgery." Vol. VIII., No. 3 (1887). *From the Editor.*

"The Canadian Record of Science." Vol. II., No. 7 (1887). *From the Natural History Society of Montreal.*

"The Journal of the Cincinnati Society of Natural History." Vol. X., No. 2 (1887). *From the Society.*

"Transactions of the Wagner Free Institute of Science Philadelphia." Vol I (1887). *From the Institute.*

PAPERS READ.

NOTES ON SOME INDIGENOUS SAGO AND TOBACCO  
FROM NEW GUINEA.

BY J. H. MAIDEN, F.R.G.S.,  
CURATOR OF THE TECHNOLOGICAL MUSEUM, SYDNEY.

SAGO.

This sample of Sago meal or flour was brought by Mr. Theodore Bevan from Evorra village, Jubilee River, 16 miles north-east of Bald Head. This locality had never, in all human probability, been visited by a white man before.

It is of course of native manufacture, and is from indigenous sago (? *Sabal Adansonii* which forms forests in New Guinea and New Ireland, or possibly *Sagus Konigii* and *S. leve*). Mr. Bevan took a photograph of natives engaged in the operation of making sago. (1) The following description, taken from Balfour's Cyclopædia of India, of the process as carried on in the Archipelago, serves fairly for a description of that which obtains in the interior of New Guinea, as described by Mr. Bevan to me, and as depicted in the photograph alluded to.

"A tree is cut down close to the ground, the leaves and leaf-stalks cleared away, and a broad strip of the bark taken off the upper side of the trunk. This exposes the pithy matter, which is of a rusty colour near the bottom of the tree, but higher up pure

---

(1) At page 349, Vol. X. Proc. Linn. Soc. N.S.W., Miklouho-Maclay says that sago *Sagus sp.* ("Buam"), is regarded as a luxury on the Maclay coast, and is not used commonly as food. Mr. Bevan, however, reports sago to be plentiful in the district he visited.

white, and about as hard as a dry apple. The pith is cut or broken down into a coarse powder (1) by means of a club of hard and heavy wood, having a piece of sharp quartz rock (2) firmly imbedded into its upper end. By successive blows, narrow strips of the pith are cut away till it falls down into the cylinder formed by the bark, leaving only a skin not more than half an inch in thickness (3). These pith-strips are then put into a washing-trough made of the large sheathing vases of the leaves, and the strainer is the fibrous covering from the leaf-stalks of the young cocoa-nut. Water is then poured on the mass of pith which is pressed against the strainer, and kneaded until all the starch is dissolved (*suspended*, sago, like any other starch, being insoluble in cold water, J.H.M.), and passes through into a trough with a depression in its centre, into which it is deposited, the surplus water trickling away. When the trough is nearly full, the mass of starch, which has a slightly reddish tinge, is made up into cylinders, wrapped up in sago leaves, and is the raw sago or

The following slightly different account of the operation of sago manufacture, as carried on in New Guinea, is taken from "A Voyage to New Guinea, &c," by Capt. Thomas Forrest, 2nd ed., 1780, p. 39, et seq.

"The sago or libby tree has, like the coco nut tree, no distinct bark that peels off, and may be defined as a long tube of hard wood, about two inches thick, containing a pulp or pith mixed with many long fibres. The tree being felled, it is cut into lengths of about five or six feet. A part of the hard wood is then sliced off, and the workman, coming to the pith, cuts across (generally with an adze made of hard wood called aneebong) the longitudinal fibres and the pith together, leaving a part at each end uncut, so that, when it is excavated, there remains a trough, into which the pulp is again put, mixed with water, and beat with a piece of wood; then the fibres, separated from the pulp, float on top, and the flour subsides. After being cleared in this manner by several waters, the pulp is put into cylindrical baskets, made of the leaves of the tree, and, if it is to be kept some time, those baskets are generally sunk in fresh water to keep it moist."

Another allusion to New Guinea sago (and this refers to a spurious one) is in Hassall's "Food and its Adulterations," in which occurs the passage:—"Pareira also states that he received from Professor Guibourt samples of "*Sagou des Maldives de Planche, donné par lui*, and, *Sagou de la Nouvelle Guinée, donné par lui*," and that he found them to be factitious sagos prepared from potato starch. The grains of the New Guinea sago were bright red on one side and whitish on the other."

It is well-known that France and Germany first taught Europe how to manufacture "pearl sago" out of potato starch, but the sample now before you is undoubtedly unsophisticated New Guinea sago, procured from a village the natives of which are probably ignorant of the arts of adulteration, which belong only to civilization.

In appearance and texture it reminds one strongly of the "Bath brick" so much used in England by domestics for polishing purposes. It is of a light buff colour, crumbling readily in the fingers into a flour. On keeping, it becomes of a light brown, or even a rusty colour, on the outside.

Mr. Bevan tells me the sample was moist and soft and capable of being cut with a knife when he received it. In that state it is ready to undergo the operation of granulating or "pearling."

This refinement, introduced at Singapore in 1819 by Chinese workmen, but in use in Malacca for many years previously, was known to New Guinea natives at least as early as 1777, Captain Forrest then describing the process in use. Balfour (*loc. cit.*) says that the Malays learnt the art from the natives of Bukit Batu (Siak). It therefore becomes interesting to learn how and when the operation became known to the natives of New Guinea, or whether in fact, the invention is owing to them.

From a native of the island of New Guinea, in a letter to the

planting is very small compared to the returns when once they begin to come in. It has been calculated that a plantation of 2000 acres would give a profit of £15,560 a-year. Since this calculation was made the price of sago has declined, but there is no chance of its not yielding a good profit to the grower. It is also to be remembered that the sale value of a newly planted sago plantation would rise heavily yearly."

The soil and climate of Borneo are very similar to that of New Guinea. Does not everything point to New Guinea as suitable for sago planting? The systematic culture of sago and tobacco in this new colony is worth trying, I would suggest; and at present this seems to be the most feasible method of utilizing its resources.

#### HYGROSCOPIC MOISTURE.

The mean of my experiments gives 13.29 as the percentage of moisture which can be driven off at a temperature of 100° C.

#### STARCH.

It contains 91.03 per cent of starch.

The method adopted has been that of Siegert, and consists in the conversion of the sago-starch into Dextrose (Dextro-glucose) by treatment with dilute sulphuric acid, and the estimation of this sugar by means of Fehling's Solution in the usual manner.

Another method adopted was that of Bungener and Fries, which consists in boiling the sago with 1° solution of salicylic acid; in this way all the starch is dissolved out. This gave 95.16 of starch, there being left 4.84 per cent. of a brownish flocculent insoluble substance which was not further examined. This method cannot be considered so satisfactory as the dextrose process, and to ensure absolute accuracy the salicylic solution should be treated with dilute acid and the dissolved starch converted into dextrose. Its simplicity however recommends it.

The above experiments were determined upon the sago dried at 100° C.

The only allusion to the quantity of starch in sago, I can find, is in Prof. Church's "Foods," in which he gives the percentage for sago (presumably ordinary pearl sago) tapioca, arrow-root, cornflour, and maizena at 83 (evidently an approximation, and only intended as such). This result refers to sago at the ordinary temperature of the air, and, taking 12 as the percentage of hygrometric moisture, we find the percentage of starch in ordinary sago to be 94.32 (calculated on the substance dried at 100° C).

#### MICROSCOPE.

This sago as seen under the microscope presents a very similar appearance to that depicted at fig. 116 of Hassall's "Food and its Adulterations." The hilum is well marked, the rings though faint are evident, the shape of the grains oval, oblong-oval, truncate-oval, and a few sub-triangular. I cannot resist comparing the shape and markings of some of the granules to fragments of earthworms snipped off with a pair of scissors.



Seas and China, of which the best is Manila (1) tobacco. It is essentially a cigar tobacco in contradistinction to a manufacturing tobacco, having a very decided cigar-tobacco flavour; the strength of this flavour is remarkable, considering, as you say, and as it bears evidence of, being sun-cured.

“As a merchantable article it is next to useless, but more than interesting as a specimen, as it is almost certain that where that grew, an article would grow that would have at least a fair marketable value in England and the Continent.”

There is no doubt whatsoever that New Guinea, in common with some other islands of the Eastern Archipelago, is capable of growing tobacco of high quality. I may cite the Report on the specimens of raw tobacco exhibited by the colony of North Borneo at the Colonial and Indian Exhibition, because the climate and soil of Borneo are so very similar to that of New Guinea. The

---

(1) East Indian, Manila and Turkish tobaccos are the produce of *Nicotiana rustica*, Linn. American tobaccos are the produce of *N. Tabacum*. The leaves of *N. Tabacum* are tapering oval-lanceolate and sessile, those of *N. rustica* being ovate, cordate and stalked. Of these two species the former seems much the hardier, and in most countries when it is cultivated to any extent, has become acclimatised, springing up in great profusion, self-sown. The latter form, on the other hand, is rarely found to do this, and is thus met only under cultivation. See Reports on the Colonial and Indian Exhibition, Art. “Tobacco.”

The species of the genus *Nicotiana* are all indigenous in America, except our *N. suaveolens*, which is to be found all over Australia. The lamina of the largest leaf of the New Guinea tobacco now under examination has a length of 9 inches, while the petiole is 2 inches long. The average length of the laminae is, however, 7 inches. They are all ovate-lanceolate, rather obtuse and none subcordate, which latter characteristic is mentioned by Asa Gray (Syn: Flora North America) as belonging to *N. rustica*. The presence of a longish petiole at once excludes this tobacco from *N. Tabacum*, and of all the species described by Asa Gray it certainly comes nearest to *N. rustica*. It is not very remote (I speak of the foliage alone) from our *N. suaveolens* with its spatulate leaves, but in all the specimens of that species I have examined, the lower portion of the leaf tapers far more into the petiole than is the case with any leaf of this New Guinea tobacco. It is to be hoped that Mr. Bevan or some other explorer will procure whole plants of this far-inland tobacco in flower and fruit.



Report states, "The specimens were of a very superior quality, both in aroma and appearance. They are well-adapted for cigar-making, and were considered amongst the best in the Exhibition."

I have alluded elsewhere to the desirability of testing New Guinea for the growth of tobacco, and I cannot do better than make the following extracts from the Experts' Report to which I have above alluded.

"There is perhaps no more patent fact than that it is practically immaterial what seed is used; it is the chemistry of the soil that can alone ensure good tobacco. Not only does the tobacco raised in one country differ from that obtained in another, from the self-same seed, but this variation may be as great between the produce of one field and another within the same district. It is the merit of one country to produce mild and aromatic tobacco, of another strong tobacco, and even with the most careful manuring it may not be possible to overcome these distinctions. . . . .  
When seed is imported, a mongrel crop is produced the first

It is obvious that these figures teach but little, and cannot rigidly be compared with others unless the hygrometric state of the atmosphere at each place of experiment be given in all cases.

Nevertheless it will be interesting to compare the following figures for hygrometric moisture :—Turkey (Dr. Letheby), 12·4 per cent ; his other figures fluctuating between 10·8 for German, and 13·4 for Maryland. Professor Church give the average percentage of moisture in tobacco at 13 per cent. These results have doubtless all been obtained in the more humid atmosphere of England.

#### EXTRACT (WATER).

It yields 49·36 per cent of extract to water at 100° C.

Dr. Letheby gives the yield of extract of Turkey tobacco at 60·6, and his sample contained 12·4 percent of hygrometric moisture. Calculated upon the dry leaf this would of course give a percentage of 68·1. The other percentages he gives (on the tobacco at 60° F.) vary between 43·4 for Virginian to 64·4 for Maryland.

Swedish tobacco is said to yield 50-64 per cent. of extract of (Dingl : Polytech : Journ : CCXXV. 615).

#### EXTRACT (AMMONIACAL ETHER).

Hygrometric moisture...	...	10·55
Chlorophyll and fat	...	6·2
Nicotine	...	1·8
		<hr/>
Total per cent soluble in ether...		18·55

#### ASH.

It yields 18·7 per cent of ash.

Dr. Letheby gives the percentage of ash in Turkey tobacco at 10·6, and Watts' Dict. at from 17-23. In this work we have the ash of good Havana 16-16·8 (Letheby 18·6), inferior sorts, 17·8-19·4 ; Letheby's figures also give German the maximum of 22·6. Professor Church ("Foods," the South Kensington Museum handbook) gives the ash of tobacco at from 13 to 28 per cent.

The nature of the soil has of course much to do with the percentage of ash, as also of the ash-constituents; no information is forthcoming as to the soil on which the sample now under examination was grown.

#### NICOTINE.

The tobacco contains 1·8 per cent of Nicotine.

The process adopted was that of Schlösing, and consists in exhausting the leaf with ammoniacal ether in a suitable apparatus. The solvent is then evaporated, and the quantity of alkaloid determined by observing the amount of standard sulphuric acid it is capable of neutralising.

## NOTES ON *ZELOTYPHA STACYI*, AND AN ACCOUNT OF A VARIETY.

BY A. SIDNEY OLLIFF, F.E.S.,  
ASSISTANT ZOOLOGIST, AUSTRALIAN MUSEUM.

The magnificent Hepialid which the late Mr. A. W. Scott described under the name *Zelotypia Stacyi* from imperfect specimens found at the Manning River and in the neighbourhood of Newcastle, has been obtained in some numbers during the last few years by the Newcastle miners. As the insect is rarely found in the perfect or imago condition the larva has to be sought for and reared, a matter of no little difficulty as it lives, like those of the allied genus *Charagia*, in cylindrical burrows which it makes in the interior of the stems or branches of trees, sometimes near the surface of the ground and sometimes at a height of fifty or a hundred feet. By searching for these burrows and rearing the larvæ or pupæ when found, a considerable number of specimens have been obtained by the miners, but I am informed that the supply is by no means equal to the demand. (1) Sometime ago Mr. R. Thornton, who has reared a number of the lignivorous lepidoptera, transmitted to the Australian Museum the larva and pupa of this species preserved in alcohol, and subsequently he brought for my inspection a male *Zelotypia* which he thought might prove to

---

(1) Since this article was written I have paid a visit to the mining district in the neighbourhood of Newcastle and have made enquiries as to the time of year when the perfect insect makes its appearance. I am told that when a fully grown larva or pupa is found its precise position is carefully noted, and the locality revisited in December or early in January according to the season. The portion of the limb or sapling containing the animal is then cut and brought home, the end being placed in damp sand to prevent shrinking. The moth usually makes its appearance in February and March.

be a distinct species as it differed materially from any he had previously seen. These specimens form the subject of the following notes.

LARVA—Length 132 mm.; width of head 11 mm.

The larva of *Z. Stacyi* is long, cylindrical, and fleshy, pale yellow above; the divisions between the segments inclining to reddish brown; the first three segments rather bright red, the following segments, with the exception of the last two, provided with three pale testaceous spots in the middle and two on each side; of these the middle spots are transverse, one being placed in front of the two others which are much smaller and situated near the posterior margin; the head is black and finely rugose; legs small, the claws black; stigmata of the usual number.

The larva makes its burrow in the limbs, or occasionally in the trunk, of the Eucalypt (*E. tetricornis*; locally known as the grey gum. It is very active, and like the Charagiæ, forms a bag-like covering of triturated bark about the opening of its burrow, which it closes before pupating with a thick pad resembling a gun-wad.

## ZELOTYPHA STACYI var. SINUOSA.

♂ Antennæ reddish brown. Head, front of thorax, and abdomen salmon red; the thorax with two broad streaks of white scales, one on each side, which meet behind; abdomen with the last two segments greenish black. Forewing dark fawn colour, the basal half and the apical extremity silvery white, the former dusted with fawn colour, a large ocellus very indistinctly encircled with brown at the end of the discoidal cell, beyond this a moderately broad and very clearly defined silvery white fascia obliquely crosses the entire width of the wing; within this fascia, between veins 1-5, and near the inner margin, the ground colour is more pronounced; the space between the fascia and the hind-margin, which is also deeper in colour, occupied with five or six series of irregular bar-shaped markings; these markings are at right angles to the veins within which they are contained; costa marked with three or four rather obscure patches of white. Hindwing salmon red, darker externally. All the wings crumpled at the extremities. Expanse of wings 166 mm. (1); length of body 64 mm.

Although I have examined a considerable number of *Zelotypiæ* this is the only one I have seen answering to the above description. The points in which it differs from the typical *Z. Stacyi* are at once perceptible and may be summarized as follows:—The ocellus without the white margin and only obscurely surrounded with brown, the oblique fascia much more pronounced with the edges clearly defined, the presence of peculiar bar-like markings near the hind-margin (very unlike the thin, wavy lines on the typical form), and the dull fawn coloured, obscurely marked costal margin, not to mention the deeper ground colour of the whole of the external half of the wing.

---

(1) The largest female *Z. Stacyi* I have seen is fully ten inches across the wings, measured according to the approved method, i.e. from the tip of the forewing to the middle of the thorax doubled.

470 NOTES ON ZELOTYPHA STACYI, AND AN ACCOUNT OF A VARIETY.

The specimen was reared from a larva found in the trunk of a black apple tree (1) some three or four feet from the ground, and the only peculiarity observed during its transformation was that the pad with which the larva when fully grown closed the entrance to its burrow was much smaller and less dense in texture than is usually the case. Possibly this specimen may indicate a species distinct from that of the grey gum, but in the absence of more information I prefer to regard it as a variety.

In conclusion it may be of interest to add that the name 'bent-wing' has been conferred upon this moth by the miners.

---

(1) I am not aware if this is *Achras australis*, which usually passes under that name.

# A REVISION OF THE STAPHYLINIDÆ OF AUSTRALIA.

BY A. SIDNEY OLLIFF, F.E.S.,  
ASSISTANT ZOOLOGIST, AUSTRALIAN MUSEUM.

---

## PART III.

---

### Sub-Family III.—STAPHYLININÆ.

Prothoracic stigmata conspicuous, sometimes hidden by a corneous plate. Antennæ 11-jointed, inserted upon the anterior margin of the epistoma. Mandibles furnished on the inner side with a membrane which is partly free. No ocelli. A membranous space underneath the prothorax. Abdomen strongly margined laterally. Anterior coxæ large and conical ; the posterior sub-conical. Posterior trochanters prominent. Tarsi 5-jointed, except in *Tanygnathus* which has only four.

This subfamily contains the largest and most brilliantly coloured members of the section, many of which are eminently predatory in their habits. *Xantholinus* and the allied genera are composed of very long and narrow species, and the true Staphylinina mostly of more robust forms ; of the latter *Oreophilus*, *Actinus*, *Mysolius*, and the species which I have characterized under the name *Colonia regalis*, are the most conspicuous types.

The different species are found under stones, under bark, in carrion or any decaying animal or vegetable matter, in moss, and occasionally in ants' nests. To the third tribe of the subfamily belongs the curious parasitic species *Quedius dilatatus*, which is found in Europe living in hornets' nests, but no species with similar habits has yet been detected in Australia.



Tribe 1. XANTROLININA.

Antennæ inserted near the middle of the anterior margin of the front, near together. Prothorax with the lateral margin double ; the prothoracic stigmata uncovered.

30. *Diochus*.

Erichson, Gen. Staph. p. 300 (1840) ; Lacordaire, Gen. Col. II. p. 65

Mentum very broad. Ligula membranous, short, rounded and slightly emarginate in front. Paraglossæ distinct. Maxillary palpi with the 1st and 3rd joints nearly equal, the last joint subulate. Labial palpi with the 2nd joint a little shorter than the 1st, the terminal joint very small and subulate. Maxillæ with the inner lobe ciliated internally ; the external lobe ciliated at its extremity. Mandibles very short. Labrum small, transverse, sinuate in front. Head elongate, narrowed anteriorly, connected with the prothorax by a very slender neck. Eyes small, rounded.

thorace majore, basi capite duplo fere latiore, oblongo, convexo, antice fortiter angustato, angulis omnibus fortissime rotundatis, seriebus dorsalibus tripunctatis, oblique inter apicem mediumque sitis, punctis 2 aliis post angulum anticum sitis; elytris basi thorace paulo latioribus, circa apicem latioribus, serie suturali discoidalique utraque punctis 6 subtilissimis impressis; abdomine dense subtilissime fusco-pubescente, subopaco, omnium creberrime subtilissime, apice parcius, punctulato. Long. 5 mm. (*Fvl.*)

Wide Bay, Queensland; Victoria.

#### 114. DIOCHUS DIVISUS.

*Diochus divisus*, Fauvel, Ann. Mus. Genov. X. p. 235 (1877).

A praecedente magnitudine minor, thorace piceo, antennis vix medio infuscatis, ore, elytrorum dimidia parte apicale, segmentorum marginibus, sexti dimidia parte apicali, septimo toto pedibusque rufo-testaceis; antennis brevioribus; capite minore, brevior, subtriangulari, antice sat fortiter angustato, basi minus rotundato; thorace antice paulo minus angustato; elytris seriebus vix fortius, abdomine adhuc subtilius densiusque punctatis. Long. 4 mm. (*Fvl.*)

New South Wales.

#### 31. LEPTACINUS.

Erichson, Käf. Mark, I. p. 429 (1837); Gen. Staph. p. 333 (1840); Lacordaire, Gen. Col. II. p. 69.

General characters of *Xantholinus*. Ligula slightly emarginate in front. Palpi, both maxillary and labial, with the last joint small and acicular; the labial palpi with the 2nd joint a little longer than the first. Labrum deeply sinuate; the lateral margins membranous. Antennæ filiform. The intermediate coxæ moderately distant or contiguous; the anterior tarsi sometimes simple, sometimes dilated.

A genus of world-wide distribution resembling *Xantholinus* in *facies*.

118. LEPTACINUS LINEARIS.

*Staphylinus linearis*, Gravenhorst, Col. Micr., p. 43 (1802)—  
*Leptacinus linearis*, Jacq. Duv., Gen. Staph. p. 12, f. 59.

Pitchy black, shining, finely pubescent; prothorax with a dorsal series of eight or ten punctures on each side; elytra uniformly dark brown.

Head with the sides more finely and less closely punctured than the allied *L. batychrus*, the lateral rows of punctures more regular. Antennæ reddish testaceous. Scutellum smooth. Legs pitchy. Length 4.5 mm.

Port Lincoln, South Australia.

A common European species which has recently been recorded from South Australia by the Rev. T. Blackburn. It is probably introduced.

119. LEPTACINUS PICTICORNIS.

120. LEPTACINUS FILUM.

*Leptacinus filum*, Blackburn, Trans. Royal Soc. S. Australia, 1887, p. 7.

Angustus ; parallelus ; nitidus ; niger ; antennis, palpis, pedibusque piceis ; elytris nonnullis exemplis apicem versus dilutioribus ; antennarum articulis 4-10 sat fortiter transversis ; capite elongato ; crebre subtilius punctato, fronte longitudinaliter obsolete bifoveolato ; prothorace tertiâ parte longiore quam latiore, subtiliter crebrius vix lineatim punctato, disco laevi ; elytris prothorace vix longioribus, crebrius subtiliter confuse punctatis ; abdomine subtilissime nec crebre punctato. Long. 5-5½ mm. (*Blk.*)

Port Lincoln, South Australia.

This species is said to have the *facies* and essential characters of *Leptacinus*, but to differ from all the other species in having slightly impressed frontal foveæ and the dorsal series of thoracic punctures confused with the lateral punctures.

32. METOPONCUS.

Kraatz, Nat. Ins. II. p. 651 (1857)—Fauvel, Fn. Gall.-Rhen., III. p. 379.

General characters of *Leptacinus*. Maxillary palpi with the last joint narrow at the base, subulate. Antennæ geniculate, very short, the joints large and depressed.

This genus is remarkable for the bright colouring of many of the species. Its distribution is world wide.

121. METOPONCUS CYANEIPENNIS.

*Leptacinus cyaneipennis*, Macleay, Trans. Ent. Soc. N.S.W. II. p. 137 (1871) — *Metoponcus cyaneipennis*, Fauvel, Ann. Mus. Genov. X, p. 237 (1877).

## 123. XANTHOLINUS ERYTHROPTERUS.

*Xantholinus erythropterus*, Erichson, Gen. Staph. p. 320 (1840), Fauvel, Ann. Mus. Genov. X. p. 240 (1877)—*Xantholinus cervinipennis*, Macleay, Trans. Ent. Soc. N.S.W. II. p. 138 (1871).

Pitchy black, shining; elytra, anua, and legs reddish testaceous, prothorax with a dorsal series of four or five punctures on each side.

Head sub-quadrate, rather broader than the prothorax, truncate at the base, with a few strongly impressed punctures on each side, the frontal sulci short and terminating internally in a foveolate puncture; sides nearly straight; posterior angles rounded. Antennæ piceous, a little longer than the head, the 1st joint reddish piceous, the 3rd elongate, about twice as long as the 2nd, joints 4-10 cylindrical, slightly transverse, the last joint

## 124. XANTHOLINUS LORQUINI.

*Xantholinus Lorquini*, Fauvel, Ann. Mus. Genov. X. p. 241 (1877); *l. c.* XII. pl. 1, fig. 25 (1878).

*X. auriceps* major et latior, parce longius fulvo-pubescens, nigerrimus, nitidissimus, elytris laete, palpis pedibusque sub-obscure rufis; antennis articulis 3 primis piceis, laevibus, 4-10 transversis, opacis, ultimo brevi, conico, apice vix testaceo; capite thorace tertia parte latiore, planiore, subtriangulari, fronte profunde 4-sulcata, sulcis externis transversis, puncto terminatis, sulco oculari puncto etiam terminato, punctoque alio prope adjecto plagam punctatam appropinquante; lateribus subtusque, praeter plagam mediam laevem, dense subtilius rugose punctatis, basi grosse parce punctato, medio obsolete sulcato, angulis posticis obtusis; thorace convexo, subtrapezoidali, antice oblique truncato, postice parum angustato, lateribus vix sinuatis, angulis posticis parum obtusis, puncto magno prope angulum anteriorem, serie in margine laterali parum punctata, puncturaque parca in margine anteriore notato, basi sulculo brevissimo vix impresso; elytris thorace tertia parte latioribus, nec longioribus, parce fortiter, intra humerum triseriatim, margine inflexo subtilius densiusque, abdomineque utrinque subtilissime disperse punctatis; alis fuscis. Long. 17 mm. (*Fvl.*)

Cairns, Duaringa, Wide Bay, Brisbane, Moreton Bay, Queensland; Clarence River, Newcastle, Currajong, New South Wales; also found in New Guinea, the Moluccas and Celebes.

Appears to be an abundant species.

## 125. XANTHOLINUS RUFITARSIS.

*Xantholinus rufitarsis*, Fauvel, Ann. Mus. Genov. X. p. 241 (1877).

*X. Lorquini* sat vicinus; niger, nitidissimus; palpis antennisque praeter basin piceis; tibiatarum spinulis tarsisque rufis;

Elongate, black, shining, finely and sparingly pubescent; prothorax and 5th abdominal segment red; elytra bright steel-blue; 1st and 2nd abdominal segments and legs testaceous.

Head large, much longer than broad, slightly narrowed in front, truncate behind, with four foveolate punctures near the base of the antennæ, two on the disc on each of the middle, one near the posterior angle, and two on the posterior margin; the ocular sulci are very oblique and conspicuous; the inner orbital margin of the eye impressed and provided with a distinct puncture. Antennæ dark reddish testaceous, the terminal joint inclining to pale testaceous. Prothorax slightly convex, a little narrowed posteriorly, sinuate behind the middle, truncate at the base, very sparingly and finely punctured, with a series of four moderately distinct dorsal punctures, two on each side of the middle; anterior and posterior angles rounded. Scutellum rufous. Elytra rather shorter than the prothorax, slightly narrowed in front, extremely finely and sparingly punctured. Length 6.9 mm.

Barren River, Mookan, Clarendon, Wide Bay, Pine Mountains

surface impunctate ; anterior and posterior angles rounded. Elytra about as long as the prothorax, narrowed anteriorly, moderately strongly and closely punctured. Abdomen rather finely punctured. Length  $6\frac{1}{2}$  mm.

Lottah, Gould's Country, Tasmania (*Simson*).

A very distinct species differing from all the species known to me in its uniform colour and strongly punctured head and prothorax.

### 33. XANTHOLINUS.

Serville, Encycl. Meth. X. p. 475 (1825) ; Lacordaire, Gen. Col. II. p. 68.

Mentum very short. Ligula small, entire, rounded in front. Paraglossæ large, acuminate. Maxillary palpi filiform, joints 2-4 nearly equal, the last slightly acuminate. Labial palpi filiform, the joints gradually increasing in length, the terminal joint acuminate. Maxillæ with the internal lobe shorter than the other, coriaceous, and ciliated internally; the external lobe corneous, ciliated above. Mandibles very short, falciform, dentate in the middle of the inner side, membranous and ciliate at the base. Labrum corneous, transverse, bilobed, with the sides membranous. Head more or less elongate, connected with the prothorax by a rather narrow neck. Eyes small, rounded. Antennæ short, strongly geniculate, rather robust, 1st joint moderately elongate, the 2nd and 3rd obconical, joints 4-10 short, pubescent, the terminal joint sub-acuminate at the extremity. Prothorax elongate, often a little narrowed towards the base, which is rounded ; the anterior angles usually a little produced. Elytra truncate behind. Abdomen parallel-sided. Legs short ; the intermediate coxæ distant ; tibiæ spined, the anterior pair a little thickened ; tarsi simple, the first two joints nearly equal.

This genus contains a large number of species from all parts of the world, many of which are brightly coloured. They are found in moss, decaying vegetable matter, and under bark.



*X. chalybeo* longitudine aequalia, at gracilior, corporis habita potius *X. glabrati*. Antennae capite vix longiores, articulo tertio elongato, secundo duplo longiore, 4-10 crassitie aequalibus, at sensim paulo brevioribus, nigrae, ultimo apice subferrugineo. Palpi nigri, apice rufo-picei. Caput thoracis longitudine et basi eius apici latitudine aequale, antrorsum angustatum, oblongo-subtriangulare, basi et lateribus perparum, angulis posterioribus fortiter rotundatum, supra leviter convexum, puncto maiusculo singulo ad interiorē, alteroque itidem singulo ad superiorem oculi marginem impresso, ceterum praeter sulculos anticos ordinarios laeve, nigrum, subopacum. Thorax apice coleopterorum latitudine, basin versus modice angustatus, latitudine antica paulo longior, lateribus rectis, apice utrinque oblique truncatus, angulis anterioribus subrotundatis, modice prominentibus, leviter convexus, longe intra apicem puncto singulo impressus, ceterum laevissimus, niger, subopacus. Scutellum medio punctatum, nigrum, parum nitidum. Elytra thorace vix longiora, triseriatim punctata, serie prima suturali, secunda

Head narrowed in front, extremely finely and not very closely punctured, a row of punctures on the posterior margin, two punctures on the inner orbital margin of the eye; frontal sulci strongly marked, nearly parallel. Antennæ longer than the head, joints 4-10 finely pubescent, 11th joint with the apex ferruginous. Prothorax considerably narrowed behind, truncate in front, with a conspicuous foveolate puncture near the anterior angles; sides very slightly sinuate behind the middle; the posterior angles rounded. Scutellum rather strongly punctured. Elytra with three rows of moderately strong punctures, one near the suture, the second about the middle, and the third at the side; lateral and posterior margins sparingly punctured. Abdomen sparingly and not very strongly punctured, the pubescence black. Length 13-15 mm.

Sydney, Port Hacking, New South Wales.

This species is intermediate between *Xantholinus chloropterus* and *X. cyanopterus*. From the former it may be distinguished, apart from its smaller size and different colour, by having the prothorax more narrowed behind, and the punctuation of the elytra comparatively stronger; and from the latter by the shape of the head and prothorax, which are elongate and nearly parallel-sided, as well as in colour. From *X. chalcopterus* it differs in having black legs.

### 130. XANTHOLINUS CYANOPTERUS.

*Xantholinus cyanopterus*, Erichson, Gen. Staph. p. 311 (1840).

Nigerrimus, nitidus, elytris subtiliter triseriatim punctatis, chalybeis, capite oblongo, laevi.

Antennae capite parum longiores, articulo tertio secundo duplo longiore, ultimo apice ferrugineo. Palpi apice picei. Caput thoracis latitudine, latitudine paulo longius, basi et lateribus leviter, angulis posterioribus fortiter rotundatis, antrosum paululum angustatum, supra convexum, subtilissime punctulatum, punctis utrinque tribus in capitis margine postico, duobus ad oculum

utrumque impressum, sulculis duobus anticis intermediis parallelis. Thorax coleopteris parum angustior, latitudine paulo longior, basin versus subangustatus, apice truncatus, angulis anterioribus lateribusque subrectis, leviter convexus, puncto utrinque singulo intra angulum anteriorem sat profundo impressus. Scutellum obsolete 4-punctatum. Elytra thorace paulo longiora, triseriatim punctata, serie prima suturali, secunda dorsali, tertia marginali, omnibus sat regularibus, margine apicali et lateribus inflexis vage punctatis. Abdomen parce punctatum, parce nigro-pilosum. Pedes nigri, tarsis piceis. Long. 12-14 mm. (*Er.*)

Melbourne, Victoria; Launceston, Lottah, Gould's Country, Tasmania.

The broad convex prothorax and brilliant colour of this species will prevent its being confused with any other.

### 131. *XANTHOLINUS SIDERALIS*.

*Xantholinus sideralis*, Fauvel, Ann. Mus. Genov. XIII. p. 539 (1872).

Niger, nitidus, elytris triseriatim punctatis, cyaneo-aeneis, pedibus rufo-fulvis, capite oblongo, laevi.

Habitu omnino *X. fulgidi*, at duplo maior, niger, pernitidus. Antennæ capite paulo longiores, articulo tertio secundo plus sesqui longiore, nigrae, articulo secundo tertioque basi rufo-piceis, ultimo apice ferrugineo. Palpi picei. Caput thorace paulo latius, latitudine longius, basi cum angulis posterioribus rotundatis, lateribus subrectis, antrorsum haud angustatum, sub-depressum, omnium subtilissime obsoletissimeque punctulatum, puncto maiusculo singulo ad interiorē, duobus approximatis ad superiorem utriusque oculi marginem, pluribusque irregulariter transversim positis verticis impressum. sulculis duobus anticis intermediis prope parallelis. Thorax latitudine paulo longior, basin versus angustatus, lateribus pone medium subsinuatis, basi coleopteris angustior, parum convexus, puncto singulo ad angulum utrumque anteriorem impressus. Scutellum parumpunctatum. Elytra thorace paululum longiora, subtilius triseriatim punctata, serie prima suturali, secunda in medio dorsi, tertia marginali, omnibus sat regularibus, cyaneo-aenea, nitida. Abdomen parce vageque punctulatum, tenuiter pilosum. Pedes omnes cum coxis anterioribus rufo-fulvi. Long. 10-13 mm. (*Er.*)

Rockhampton, Gayndah, Wide Bay, Brisbane, Queensland; Clarence River, Upper Hunter, Singleton, Parramatta, Sydney, New South Wales; Melbourne, Victoria; Adelaide, Nuriootpa, South Australia; Swan River, West Australia.

A careful comparison of the type of *Xantholinus cyaneipennis* with Erichson's description of *X. chalcopterus*, and with West Australian specimens which I have identified with that species, leads me to the conclusion that the former name must be regarded as a synonym.

### 133. XANTHOLINUS COELESTIS.

*Xantholinus coelestis*, Fauvel, Ann. Mus. Genov. XIII. p. 540 (1878).

Inter species elytris caeruleis forma depressa et abdomine vix aenescente, segmentorum basi crebre fortiter punctata facillime distinguendus, forma potius *chalconotus*; niger, nitidissimus, elytris caeruleis, palpis apice rufis; a *cyanoptero* statura minore, antennis vix validioribus, capite angustiore et longiore, depresso, lateribus parallelis, angulis posticis multo fortius rotundatis, punctis 2 contiguis intus prope oculi marginem posticum; basi densius punctulata; thorace multo minore et angustiore, trapezoidali, planiusculo, circa basin multo fortius angustato, lateribus magis sinuatis, antice multo minus truncato, licet angulis omnibus magis indicatis, elytris brevioribus, depressis, abdomine utrinque fortius densiusque punctato. Long. 12-13 mm. (*Fvl.*)

Melbourne, Victoria.

#### 134. XANTHOLINUS HOLOMELAS.

*Xantholinus holomelas*, Perroud, Ann. Soc. Linn. Lyon, XI. p. 84 (1864)—Fauvel, Ann. Soc. Ent. France, 1874, p. 436; Ann. Mus. Genov. X p. 244 (1877)

## 135. XANTHOLINUS ALBERTISI.

*Xantholinus Albertisi*, Fauvel, Ann. Mus. Genov. X. p. 246 (1877); *l. c.* XII. pl. 1, fig. 26 (1878).

Colore instabilis, abdomine aeneo, thorace vel aeneo, vel aeneo-violaceo, capite saepius aureo-violaceo hoc, saepe elytrisque summa basi aureo-viridibus, elytris vel violaceo viridibus, lateribus rufulis, vel vix cupreis cum palpis, antennarum mandibularumque basi rufis, his apice coxisque piceolis, antennarum articulis 4-10 transversis, opacis 11° brevi, acuminato, 3, 4, vel 5 ultimis testaceo-albidis; pedibus totis aliquando brunneis, vel piceis; capite maris maximo, deplanato, subtransverso, breviter ovato, fronte omnium subtilissime strigosula, sulcis duobus antennariis minus, oculariis magis profundis, his recte transversis, puncto terminatis, punctis duobus aliis intus prope oculi marginem posticum, quinque aliis utrinque basi, lateribus totis subtusque anguste subtiliter dense punctato rugoso, infra strigosulo, quadriimpresso; thorace elytris sat angustiore, subtrapezoidali, omnium subtilissime punctulato, puncto magno circa angulum anteriorem, lateribus vix strigosulis, ad marginem inflexum serie punctorum notatis; scutello aeneo, circiter 8-punctato; elytris thorace vix longioribus, crebre fortiter, lateribus densius, punctatis, serie intrahumerali punctorum majorum impressa; abdomine grosse sat dense utrinque punctato; alis fulvo-violaceis; ♀ capite multo minore, thorace angustiore, breviter ovato, sulcis ocularibus fere nullis, puncto post-oculari unico, utrinque ad oculorum mandibularumque basim parum dense fortius punctato. Long. 12-13 mm. (*Fvl.*)

Cape York, Somerset, Russell River, Mulgrave River, North Queensland. Also recorded from Ternate, New Guinea, Aru Islands, and the Celebes.

This species is said to vary considerably in colour and punctuation, and has been divided by M. Fauvel into three geographical forms; the first, from Ternate, has the anterior half of the head and the sides of the prothorax very finely striolate, the last three joints of the antennæ testaceous, the elytra and the abdomen

Widely distributed throughout the old world.

The different species are found in carrion, in decaying vegetable matter, or flying in the sunshine. There is, I believe, only one species at present known from Australia.

138. *CREOPHILUS ERYTHROCEPHALUS*.

*Staphylinus erythrocephalus*, Fabricius, Syst. Ent. p. 265; Erichson, Gen. Staph. p. 351 (1840).—*Creophilus erythrocephalus*, Nordmann, Symb. Staph. p. 23 (1837).

Black, depressed; head red, with a large round black spot in the front on the disc; prothorax shining; elytra tinged with blue.

Head shining, extremely finely and sparingly punctured, a setigerous puncture on the inner orbital margin of each eye. Antennæ greatly thickened towards the extremity; joints 4-6 slightly transverse, 7-10 more decidedly transverse, gradually widening, 11th much longer than the preceding, compressed at the

Black ; head red, with a large black spot in front on the disc ; prothorax shining, the posterior angles slightly rounded ; elytra black, not tinged with blue.

Lithgow, New South Wales ; Melbourne, Victorian Alps ; Lottah, Gould's Country, Port Frederick, Hobart, Tasmania.

The latter form has usually been regarded as distinct from *Creophilus erythrocephalus*, but after an examination of a large number of specimens from all parts of the country I have come to the conclusion that it can only be regarded as a variety. The most noticeable differences, namely the colour of the elytra and the slightly-rounded hinder angles of the prothorax, are characters of little importance, and in this instance of no geographical significance, as both the typical form and the variety are sometimes found in the same locality. A series of specimens which I have received from Lithgow, in the Blue Mountains, contains both black and blue forms as well as several exhibiting intermediate stages ; of these one with black elytra (var. *lanio*) has the hinder thoracic angles as strongly rounded as the typical form, a fact, I think, in itself sufficient evidence of the specific identity of the two forms.

The New Zealand form *C. oculatus*, has been recorded as Australian by M. Fauvel, but as the locality is vaguely stated to be Eastern Australia and no special reference is made to it, I think more evidence is necessary before admitting the species into our lists.

### 35. COLONIA, gen. nov.

Mentum broadly transverse, the anterior margin straight. Ligula very small. Maxillary palpi moderately long, the basal joint very short, the 4th joint acuminate, about as long as the 2nd, distinctly longer than the 3rd. Labial palpi like the maxillary in form, the last joint much longer than the 2nd. Maxillæ with the lobes distinct, the internal one shorter than the other and ciliated internally ; external lobe narrowed at the base, ciliated above.



Labrum transverse, bilobed, with a membranous border. Mandibles very strong, toothed on the basal half of the inner margin. Head transverse, sub-orbicular, narrowed behind into a moderately distinct neck. Eyes not very prominent. Antennæ short, slightly thickened towards the extremity; the basal joint long and sinuous, the following joints short and gradually decreasing in length, the terminal joint acuminate. Prothorax transverse, rounded behind, truncate in front, with the anterior angles distinct and reflexed. Elytra obliquely truncate at the extremity. Abdomen sub-parallel. Intermediate coxæ widely separated. Legs rather short, robust; the tibiæ spined; the tarsi moderately long, the anterior pair strongly dilated, the intermediate and posterior pairs filiform, with the basal joints rather longer than the three following ones.

The division which I have here ventured to propose is very nearly allied to *Creophilus* and *Ocypus*, but differs from the former genus in having the antennæ longer and more slender, the head

each shoulder and another on each side. Scutellum pointed behind, strongly and not very closely punctured. Elytra as broad as the prothorax, slightly sinuate before the middle, obscurely and sparingly punctured; the suture somewhat raised. Abdomen rather strongly and sparingly asperate-punctate; 6th segment margined with flavous posteriorly. Legs piceous. Length 18-20 mm.

♀ The head much narrower; the 7th abdominal segment entire and not emarginate below as in the other sex.

Lismore, Richmond River, New South Wales.

Two specimens of this very distinct form are in the collection of Mr. G. Masters.

### 36. ACTINUS.

Fauvel, Ann. Mus. Genov. XII. p. 250 (1878).

Mentum short, transverse. Ligula entire. Maxillary palpi with the 4th joint parallel, a little longer than the 3rd. Labial palpi filiform, the last joint a little longer than the 2nd. Maxillæ similar to those of *Philonthus*. Head large, transverse, connected with the prothorax by a slender neck. Antennæ sub-geniculate, short, thickened towards the extremity. Prosternum acute above. Metasternum sinuately rounded in front. Legs short; tibiæ spined; anterior tarsi dilated in the ♂; posterior tarsi short, the 1st joint much longer than the 5th, joints 2-4 gradually shorter, sub-triangular.

Allied to *Philonthus*, but distinguished by the structure of its antennæ and tarsi.

Two species are known, one from Australia, and one from New Guinea.

### 140. ACTINUS MACLEAYI, sp. n.

Elongate, moderately robust, black, shining, sparingly clothed with long pubescence; head and prothorax brassy, highly polished; elytra iridescent purplish green, the sides and apex brassy; the apical half of the 6th and the 7th abdominal segments, and the legs, except the coxæ, reddish testaceous.

Head moderately strongly and sparingly punctured, with a few larger punctures behind and near the inner margin of the eyes, a conspicuous depression in the middle just behind the antennæ. Antennæ somewhat thickened towards the extremity, the first four joints shining, the first two reddish testaceous, 4th joint nearly quadrate, joints 5-9 transverse, 10th and 11th yellowish white, the former transverse, the latter elongate and pyriform. Prothorax strongly convex, moderately strongly and not very closely punctured, with six rather deeply impressed punctures on the disc, three on each side of the middle; anterior angles conspicuous, reflexed; the sides strongly sinuate; posterior angles obtuse. Scutellum rather strongly and very closely punctured in the middle, the sides almost impunctate. Elytra considerably longer than the prothorax, widening posteriorly, rather closely and strongly rugose-punctate. Abdomen narrowed behind, strongly and not very closely asperate-punctate on each side of the middle which is smooth. Legs reddish testaceous. Length 19-22 mm.

## 37. MYSOLIUS.

Fauvel, Ann. Mus. Genov. XII, p. 255 (1878).

General characters of *Philonthus*. Maxillary palpi very slender, the 4th joint acicular, much longer than the 3rd. Labial palpi also slender, the 2nd joint ciliate internally, the 3rd fusi-form. Head connected with the prothorax by a slender neck. Eyes not prominent, scarcely lateral. Antennæ elongate, rather slender. Prothorax with a lateral line joined before the anterior angles. Prosternum produced above. Metasternum rounded anteriorly, not produced. Legs slender; tibiæ spined; anterior tarsi dilated in the ♂; posterior tarsi elongate, the 1st joint equal to the 5th, joints 2-4 gradually shorter.

Allied to *Philonthus*, but easily separated by the form of the palpi and prosternum, and by having the transverse impression on the neck, which borders the head, interrupted in the middle.

A single species is known from New Guinea and an allied form from Australia is here added.

## 141. MYSOLIUS CHALCOPTERUS, sp. n.

Robust, black, shining; antennæ with the last three joints white; elytra bright coppery, sometimes with a tinge of purplish, densely clothed with golden pubescence; abdomen black, tinged with purplish; legs reddish testaceous.

Head rather broad, sub-quadrate, strongly convex, narrowed behind the eyes, with four or five irregular impressions in front, a row of moderately strong punctures on the inner orbital margin of each eye, and another row extending obliquely from behind the eye to the middle of the posterior margin, strongly and rather closely punctured about the posterior angles, which are rounded. Antennæ with the first four joints reddish testaceous, 5-8 fuscous, the last three white; the basal joint elongate, the 2nd short, 3rd

creberrime subtiliter, dorso parcius fortiter punctatis, linea longitudinali sublaeviore; tarsis anticis fortiter dilatatis; segmentis 3-6 subtus sensim latius emarginatis, 5° apice, 6° disco toto impressis: 7° profunde lateque triangulariter inciso, incisura basi marginata impressa. Long.  $13\frac{1}{2}$  mm. (*Fr.*).

Bondi, Manly (on the sea-shore under decaying sea weed), Sydney, Murrumbula Point, New South Wales; Princetown, Victoria; Port Frederick, Tasmania.

A common species.

#### 143. *CAFIUS AUSTRALIS*.

*Ocypus australia*, Redt., Reise Novara, Zool. II p. 28 (1867)—*Cafius australis*, Fauvel, Ann. Mus. Genov. X, p. 251 (1877).

Magnitudine et facie *Ocypis fuscatis*: rufo-testaceus, thoraci disco nigricante, capite, scutello, pectore basique segmentorum abdominalium nigris, capite quadrangulati, non longiore quam latiore, antennis solitis, oculis punctatis, antennis tantum punctatis.

144. *CAFIUS SABULOSUS*.

*Cafius sabulosus*, Fauvel, Ann. Mus. Genov. X. p. 253 (1877).

Prope *cribratum* collocandus, sed dimidio minor, facie *Philonth. cephalotes*, et omnino distinctus; nigro-piceus, capite thoraceque plus minusve cupreis, nitidis; elytris abdomineque opacis, illis parce pilosis, apice albido ciliatis, hoc dense cinereo-sericeo; antennarum articulis 4-11, coxis anticis subtus, tibiis plus minusve, tarsis, elytrorumque sutura post scutellum et apice vix ferrugineis; his margine inflexo ferrugineo-testaceo; thorace saepius piceo; antennis brevibus, articulis 4-10 sensim magis transversis; capite convexo, ♂ quadrato, thorace latiore, ♀ hoc paulo angustiore, longiore, parcius omnium subtilissime punctulato, punctis antice prope oculos verticeque fere toto majoribus parce notato, duobus medio fronte summa, hac in ♂ breviter obsolete sulcata; thorace subcylindrico, in ♂ paulo, in ♀ tertia parte longiore quam latiore, sub-parallelo, lateribus antice parum sinuatis, punctis aliquot prope angulos anticos subrectos notato, angulis posticis fere rotundatis; scutello alutaceo, subtilius punctulato; elytris thorace sat latioribus, non longioribus, alutaceis, dense fortiter rugose, abdomine creberrime subtiliter punctatis; ♂ segmento 6° subtus apice latius sat profunde, 7° profunde triangulariter incisis. Long. 6½-8 mm. (*Fvl.*)

Cape York, Port Denison, Mackay, Gayndah, Queensland; Manly (on the sea-shore under sea-weed), Botany, Sydney, Port Hacking, New South Wales.

An abundant species.

145. *CAFIUS LAETABILIS*, sp. n.

Pitchy black, shining; head and prothorax tinged with bronze green, the latter with a series of four punctures on each side; elytra inclining to fulvous, shining.

Head somewhat convex, impressed in front, with two moderately large punctures between the eyes one on each side of the middle,

sparingly and rather strongly punctured near the posterior angles, which are rounded. Antennæ fuscons, rather short, joints 4-10 transverse. Prothorax sub-parallel, very slightly sinuate in front, with a series of four moderately strong punctures on each side of the middle, a few punctures near the anterior angles, one or two near the sides, and two or three less conspicuous ones on the posterior margin. Scutellum rather finely and closely punctured. Elytra a little longer than the prothorax, moderately strongly and not very closely punctured, the punctures less distinct at the apex. Abdomen pitchy, finely pubescent, and sparingly punctured. Legs with the femora pitchy, the tibiæ and tarsi reddish testaceous. Length 8 mm.

♀ Differs from the male in having the head and prothorax narrower, and the former much less distinctly impressed in front.

Port Lincoln, South Australia; Hobart, Tasmania.

Allied to *Cafius sabulosus*, but easily distinguished by the punctuation of the prothorax and the uniform colour of the elytra.

angles rounded. Scutellum finely and densely punctured. Elytra widening posteriorly, about as long as the prothorax, finely and rather closely rugulose-punctate, thickly clothed with grey pubescence. Abdomen moderately broad, rather closely asperate-punctate, and densely clothed with long pubescence. Legs piceous. Length, 11-13 mm.

Launceston, Hobart, Tasmania.

Differs from *Cafius laeus*, to which it is nearly allied, in having the prothorax decidedly narrower in front, the punctures of the dorsal series placed at regular intervals, and the punctuation near the posterior angles much more irregular. The three specimens I have examined appear to be females as they have the terminal segment of the abdomen entire.

#### 147. CAFIUS LAEUS, sp. n.

Black, shining; the head and prothorax tinged with bronze green, the latter with five foveolate punctures on each side; elytra dark ferruginous.

Head sub-quadrate, very strongly and sparingly punctured behind the eyes, the disc smooth, three conspicuous punctures in front; the posterior angles strongly rounded. Antennæ moderately long, dark piceous; the first three joints elongate, the 2nd and 3rd with the apex testaceous, 4th a little longer than broad, 5th to 10th gradually decreasing in length, 11th acuminate. Prothorax moderately convex, slightly narrowed behind, a little narrower than the head, with a longitudinal series of five punctures on each side of the middle, of which the second and third punctures approach one another, and one or two less distinct punctures near the shoulders; anterior angles strongly deflexed; posterior angles obtuse. Scutellum finely and densely punctured, Elytra sub-quadrate, somewhat convex, about as long as the prothorax, finely and moderately closely rugulose-punctate, thickly clothed with cinereous pubescence. Abdomen broad, closely punctured and densely pubescent; in the ♂ the terminal segment acutely emarginate beneath. Legs piceous. Length 11 mm.



Sydney, New South Wales ; Adelaide, South Australia ; Launceston, Tasmania.

A single male example.

148. *CAPIUS LITTORALIS*.

*Capius littoralis*, Fauvel, Ann. Mus. Genov. X. p. 254 (1877).

A praecedentibus [*sabulosus*] thorace seriato elytrorumque marginibus non dilutis, a sequentibus elytris abdomineque nitidulis, multo parcius fortiusque punctatis distinctus ; niger, capite thoraceque nitidis, femoribus plus minusve rufis ; antennis longioribus, sat robustis, articulis omnibus longioribus quam latioribus, 11' oblongo-acuminato ; capite quadrato, paulo longiore quam latiore, utrinque inter et post oculos basique punctis grossis subfossulatis notato, angulis posticis subrotundatis vix squamose punctulatis ; fronte antice discoque medio laevibus ; thorace antice capitis fere latitudine, tertia parte longiore quam latiore, subtrapezoidali, circa basin sat fortiter angustato, sinuato, angulis posticis obtusis ;

quadrato, thorace seriebus dorsalibus 11-punctatis, lateribus parce punctatis.

Statura elongata subdepressa omnino *Ph. fucicolae*. Antennae capite sesqui longiores, apicem versus haud incrassatae, articulo tertio secundo tenuiore et sesqui longiore, 4-10 sensim brevioribus, penultimo crassitie vix longiore, ultimo ovato, apice truncatulo et inferne acuminato, fuscae, articulis tribus primis nigris. Palpi picei, articulo ultimo rufo. Mandibulae piceae. Caput thorace paulo latius, oblongo-subquadratum, parum convexum, utrinque crebrius vage fortiter profundeque punctatum, spatio medio longitudinali inaequali laevi, nigrum, nitidum. Thorax coleopteris plus dimidio angustior, latitudine sesqui longior basin versus leviter angustatus, basi et lateribus ante medium leviter rotundatis, his pone medium subsinuatis, apice truncatus, angulis anterioribus rotundatis, posterioribus obtusis, leviter convexus, seriebus dorsalibus sat regularibus, lineae leviter impressae impositis, circiter 11-punctatis, lateribus punctis praeter marginalia utrinque fere 10, partim subseriatis, impressus, niger, nitidus, margine summo apicali et laterali inflexo sanguineo. Scutellum crebre punctatum, nigrum, opacum, subtiliter nigro-pubescens. Elytra thorace sesqui longiora, confertissime subtilius punctata, subrugulosa, nigra, opaca, limbo laterali inflexo et margine summo apicali ferrugineis, subtiliter nigro-pubescentia, apice cinereo-ciliata. Abdomen crebrius subtiliter punctatum, subnitidum, supra nigrum, segmentis 4 primis macula obsoleta, quinto apice, sexto toto subferrugineis, subtus totum ferrugineum, tenuiter subtiliterque supra nigro-, subtus ferrugineo-pubescens. Pectus nigrum. Pedes ferruginei, coxis intermediis leviter distantibus, tibiis omnibus subtiliter spinulosis. Long.  $11\frac{1}{2}$  mm. (*Er.*)

Tasmania.

#### 150. *CAFIUS SERIATUS*.

*Cafius seriatus*, Fauvel, Ann. Mus. Genov. X. p. 255 (1877).

Praecedenti [*littoralis*] facie puncturaque corporis antici propinquus, sed caeteris omnino alius: nigro piceus, minus nitidus,

antennis brevioribus, articulis minus elongatis, 4-11 ferrugineis; capite paulo densius minusque fortiter punctato, angulis posticis minus rotundatis; thorace obscure rufo-maculato, latiore breviorique, angulis anticis magis rotundatis, seriebus dorsalibus circiter 14-punctatis, punctis anticis extus quatuor lateralibusque minus grossis, magis numerosis; scutello elytrisque omnium subtilissime creberrime, abdomine adhuc subtilius vix rugosule punctulatis, opacis, creberrime subtiliter fusco sericem, segmentis 2-4 medio utrinque ferrugineo maculatis; pedibus rufo-piceis. Long. 8 mm. (Fvl.)

Victoria; Swan River, West Australia.

#### 151. *CAFIUS CATENATUS*.

*Cafius catenatus*, Fauvel, Ann. Mus. Genov. X. p. 256 (1877).

*C. seriato* vicinus, sed totus niger, antennis gracilioribus et brevioribus, capite minus nitido, minus quadrato, paulo longiore quam latiore set angustiore angulis posticis rectioribus thorace

elytris abdomineque piceis, omnino cinereo-sericeis, opacis, obsolete creberrimeque punctatis, potius alutaceis, pedibus rufis, tibiis piceis; ♂ segmento 6° subtus apice obsolete emarginato, 7° late profundeque triangulariter inciso, incisura basi impresso-marginata. Long. 6 mm. (*Fvl.*)

Middle Harbour, Manly (under sea-weed in both localities), Sydney, New South Wales; Victoria; Swan River, West Australia.

### 153. CAFIUS DENSIVENTRIS.

*Cafius densiventris*, Fauvel, Ann. Mus. Genov. X, p. 258 (1877).

*C. nautico* maxime vicinus, niger, elytris abdomineque vix nigropiceis, opacis; pedibus rufis; capite thoraceque fere densius subtiliusque, elytris densius minusque fortiter, abdomine praesertim quadruplo crebrius subtiliusque, segmento 7° tantum nitidulo parce, punctatis; abdomine multo densius subtiliusque fusco-pubescente, segmentis subtus utrinque vix piceo-marginatis. Long. 8½-9 mm. (*Fvl.*)

Port Mackay, Queensland; also found in Aru.

### 154. CAFIUS SERICEUS.

*Remus sericeus*, Holme, Trans. Ent. Soc. Lond. II. p. 64 (1837)—*Philonthus sericeus*, Erichson, Gen. Staph. p. 509 (1840)—*Cafius sericeus*, Fauvel, Ann. Mus. Genov. XIII. p. 542 (1878).

Black, somewhat opaque; the elytra and abdomen clothed with golden yellow pubescence.

Head rather closely and deeply punctured. Antennæ pitchy red. Prothorax closely and strongly punctured on each side, with a raised median line. Elytra one half longer than prothorax closely and finely punctured. Abdomen rather closely punctured. Legs pale pitchy. Length, 3½-4 mm.

Adelaide, South Australia; Swan River, West Australia; also in Europe, Madeira, &c.

A variable species.

155. *CAFIUS OCCIDENTALIS*.

*Cafius occidentalis*, Blackburn, Trans. Royal Soc. S. Australia, 1887, p. 13.

Niger; elytris abdomineque plus minusve nigro-piceis, his apice dilutioribus; ore antennis pedibusque rufis vel piceo-rufis; antennis capiti prothoracique conjunctis longitudine subaequalibus sat gracilibus; capite antice medio longitudinaliter sulcato, utrinque crasse seriatim punctulato; prothorace sat elongato, disco subtilius biseriatim punctulato, spatio intermedio lato convexo, lateribus punctis sat crebris subseriatim instructis; elytris creberrime subtilissime subrugulose punctulatis, prothorace sat longioribus, parce sericeo-pubescenti. Long.  $4\frac{1}{2}$ - $5\frac{1}{2}$  mm. (*Blk*)

West Australia.

Mr. Blackburn states that this species closely resembles *Cafius sericeus* in form and colour, but differs in being less opaque, in having less distinctness of the elytral punctures, and in having

♂ *H. rufipenni* paulo major; nitidissimus, parce longe nigro pilosus, capite, thorace elytrisque læte cupreis, abdomine nigro, vix irideo; ore, antennis articulis 3 primis, thoracis marginibus subtus, elytris humeris margineque laterali, abdominis segmento 6° apice 7° que toto, pedibusque cum coxis anticis rufis; antennis sat incrassatis, pilosis, caeterum nigris, articulis 3 vel 4 ultimis flavis; capite sat fortiter transverso, subquadratum orbiculari, angulis posticis rotundatis, fronte antice subimpressa, breviter longitudinaliter sulcata, punctis binis utrinque ad impressionem, alio extus majore in margine oculi, 3 vel 4 aliis prope oculi angulum posticum interiorem, caeterum post oculos subtilius parum dense punctato; thorace convexo, subquadrato, tertia fere parte longiore quam latiore, capitis latitudine, circa basin vix angustato, basi fortiter rotundato, antice truncato, angulis anticis subrectis, seriebus dorsalibus duabus 10 vel 12 fortiter punctatis, punctis aliis saepius minoribus utrinque dispersis; scutello creberrime subtilissimeque punctulato, virescente; elytris fere transversim quadratis, thorace tertia parte latioribus, parum brevioribus, subconvexis, parce sat fortiter subsquamose, abdomine vix fortius, basi parce, apice crebrius, subtus dense punctatis; segmento 6° subtus apice sinuato, 7° subtriangulariter sat late profundeque inciso; tarsis anticis fortiter dilatatis. Long. 11½ mm. (*Fvl.*)

♀ latet. (*Fvl.*)

Barron River, Pine Mountains, Gayndah, Wide Bay, Brisbane, Moreton Bay, Queensland; Clarence River, Upper Hunter, Illawarra, New South Wales.

I think there is no doubt that the above synonymy is correct. M. Fauvel's very accurate description, which I have quoted in full, agrees in every detail with the type of *Hesperus haemorrhoidalis* in the collection of the Australian Museum.

#### 157. *HESPERUS PACIFICUS*, sp. n.

Black, shining, very sparingly clothed with long black pubescence; head, prothorax, and elytra bronze-green; antennæ with the last joint testaceous; abdomen with the apex of the 6th and the whole of the 7th joint reddish testaceous; legs pitchy.

Head rather strongly transverse, somewhat impressed in front, longitudinally sulcate in the middle, with two rather strongly impressed punctures on each side of the middle, and two on the inner orbital margin of the eye; strongly and rather closely punctured behind the eyes, and near the posterior angles. Antennæ somewhat thickened towards the extremity, the first three joints scarcely paler than the rest, joints 4-10 pilose. Prothorax rather convex, narrowed towards the base, truncate in front, rounded behind, with a dorsal series of ten or eleven strongly impressed punctures on each side of the middle, between these dorsal series and the margins strongly and sparingly punctured, an irregular row of punctures at the anterior angles. Scutellum rather finely and densely punctured. Elytra inclining to brassy green, finely pubescent, slightly convex, a little shorter than the prothorax, narrowed in front, rather strongly and not very closely punctured, the punctures more dense and less strong at the base, very irregularly punctured at the sides; all the angles rounded. Abdomen strongly and moderately closely asperate-punctate.

Black, shining, sparingly pubescent; antennæ with the last three joints testaceous; elytra dark reddish testaceous; abdomen with the apex of the 6th and the whole of the 7th joint reddish testaceous; tibiæ and tarsi reddish testaceous.

Head rather strongly transverse, somewhat impressed in front, with two rather strongly impressed punctures on each side of the middle, strongly and rather closely punctured behind the eyes and near the posterior angles. Antennæ thickened towards the extremity; joints 4-7 elongate, gradually decreasing in length. Prothorax rather convex, narrowed towards the base, truncate in front, rounded behind, with a dorsal series of ten or eleven very strongly impressed punctures on each side of the middle, the space between these dorsal series and the margins very strongly and sparingly punctured. Scutellum rather finely and densely punctured. Elytra slightly convex, finely pubescent, shorter than the prothorax, narrowed in front, moderately strongly and closely punctured; anterior and posterior angles rounded. Abdomen tinged with violaceous, moderately strongly and rather closely punctured. Legs with the femora pitchy; the tibiæ and tarsi reddish testaceous. Length 10-11½ mm.

Gayndah, Queensland; Parramatta, Sydney, New South Wales.

The black head and prothorax, and red elytra at once distinguish this species from its allies.

#### 159. *HESPERUS SEMIRUFUS*.

*Hesperus semirufus*, Fauvel, Ann. Mus. Genov. XIII. p. 543. (1878).

*H. australi* latior, laete rufus, nitidus, longius parce nigro pilosus, femoribus piceis, tibiis fere totis albidis, antennis articulis 4-10 nigricantibus, abdomine praeter segmenti 6! apicem 7<sup>um</sup>que testacea toto nigro-irideo; antennis brevibus, validis, articulis 6-10 brevissimis, maxime transversis, 11° lato, oblique truncato; capite transversim orbiculato, fronte media foveolata, intero culos transversim 4-punctata, post oculos parce fortiter, basi summa utrinque



subtiliter punctato, caeterum laevi; thorace lato, brevi, convexo, capite latiore, quarta parte longiore quam latiore, disco utrinque parce fortius, lateribus vage subtilius, longe ante basin late laevem fossulato; scutello elytrisque ut in *mirabili*, abdomine praesertim basi densius fortiusque punctatis. Long. 12 mm. (FvL)

♂ latet.

Cairns, Port Denison, Queensland.

A very distinct species.

#### 160. *HESPERUS PULLEINEI*.

*Hesperus Pulleinei*, Blackburn, Trans. Royal Soc. S. Australia, 1887, p. 7.

Niger, nitidus, parce nigro-pubescent, clypeo, palpis, antennis et abdominis segmentis ultimis 2 laete testaceis (his aureo-pubescentibus), elytris violaceo-caeruleis; capite fortiter transversim quadrato. crasse punctato. disco laevi; prothorace transverso.

## MISCELLANEA ENTOMOLOGICA, No. IV.

### “ THE HELÆIDES.”

BY WILLIAM MACLEAY, F.L.S., &c.

In this Paper I undertake the revision of a group of the large Family of Tenebrionidæ, remarkable for its eccentricity of form. Under the name of “ Helæides,” Lacordaire in his “ Genera Coléopt. Vol. V.” includes some genera of Heteromorous beetles, all more or less resembling in general characters the typical genus *Helæus*, and all exclusively of Australian parentage.

Until the year 1842, but little was known of these insects, a very few species only having been described by Olivier, Kirby, and Boisduval, but in that year a monograph of the group was published by the Marquis de Brême, entitled “ Essai Monogr. et Iconogr. de la Tribu des Cossyphides.” In this monograph the number of species noticed or described, amounted to 37, spread over four genera. In the year 1846 (1) the Rev. F. W. Hope published descriptions of eight additional species. Since then the chief additions to the group have been made by Mr. Pascoe, and the number of his contributions may be inferred from the fact that the number of species recorded in Masters’ Catalogue of Australian Coleoptera, published last year in the Proceedings of the Linnean Society of New South Wales, had risen to 97.

The characters of the Helæides, in addition to those common to all the Tenebrionidæ, are given below.

---

(1) Trans. Ent. Soc. Lond. Vol. V. p. 52.

## Sub-family HELÆIDES.

Labial palpi strongly separated at the base. Inner lobe of the maxillæ armed or not with a corneous hook. The last article of the maxillary palpi strongly securiform. Mandibles bifid at the apex. Head short, deeply sunk in the thorax—the clypeus square, rarely narrowed in front, and separated from the forehead by an arched groove or suture. Antennæ slender, the third joint very elongate, the rest obconic, the last three, four or five joints moniliform, perfoliate, forming an indistinct mass. Prothorax emarginate in front, and foliaceous on the sides; elytra for the most part similarly margined. Scutellum large, curvilinearly triangular. Anterior haunches cylindrical and transversal, anterior tibiæ almost always terminated by a single spur, the intermediate and posterior by two short and in general strong spurs, the tarsi ciliated or pubescent beneath. Intercoxal projection variable. Metasternum of varying length, the episterna narrow, parallel, the epimera distinct. The mesothoracic epimera large, closing on a

and *Saragus*. The distinctive characters of these genera and their peculiarities of habit will be found under the descriptions attached to each, as far as they are known, but that unfortunately is very little. The larvæ seem to be quite unknown, though no doubt they are chiefly, if not altogether, feeders on decaying wood, but the perfect insects are found some on the ground under logs and stones, others under the bark of living trees, and, as a rule, it may be said, that those found on or near the ground are of the apterous genera, while the winged genera are inhabitants of trees. .

I give descriptions of all the species which have not been previously printed in the Proceedings of this Society.

Genus *ENCARA*, Gemminger.

Col. Heft. VI. 1870. Syn. *Encephalus*, Brême. Mon. Cossyph. 1, p. 23.

Head entirely sunk in the emargination of the thorax, small, square. Eyes very large, almost contiguous above, widely separated beneath. Antennæ shorter than the thorax, the three last joints depressed, forming a small indistinct mass. Thorax strongly transversal, parabolically arched on the sides, rather narrowly and profoundly emarginate in front, imperfectly contiguous to the elytra and cut almost squarely at the base, with a broad but slightly projecting median lobe; the foliaceous margin very broad and flat. The elytra broadly and regularly ovate, rounded behind and convex on the disk with the foliate margin broad and flat. Legs long and slender; tibiæ smooth, their spurs almost invisible. Metasternum elongate. Mesosternum horizontal, forked. Prosternal projection compressed, obtusely carinated, penetrating into the emargination of the mesosternum. Body orbicularly-ovate, winged.

The insects falling into this genus were placed by De Brême in the genus *Encephalus*, under the impression (evidently a mistake), that Kirby had applied that name to the species now named *Encara Westwoodii*, Boisd. Gemminger substituted the present name as *Encephalus* is the name given by Westwood to a genus of the Staphylinidæ.

1. *ENCABA WESTWOODII*, Boisd.

Syn. *Cilibe Westwoodii*, Boisd. Voy. Astrol. II. 1835, p. 263;  
*Encephalus gibbosus*, De Brême, Mon. Cossyph. 1, 1842, p. 23,  
pl. V. fig. 5.

Reddish brown, smooth, nitid, broadly ovate. Head broad, sub-quadrate, slightly punctate, the angles of the epicranium and the lateral borders of the clypeus a little elevated, forehead depressed between the eyes, which are very close together. Thorax transverse, convex, a little sinuated behind, smooth and somewhat irregularly gibbous on the disk, which is nearly black, margins broad and flat, with the anterior angles a little rounded and not reaching the front of the head, the posterior angles salient and acute. Elytra of oval form and a little elongate at the apex, strongly and bluntly raised, forming a boss towards the apex, and two other small oblique bosses towards the shoulders; the margins broad and of a redder brown, feebly folded above on the back. On each extremity two broad, little, beated

finely punctate, rounded on the sides, scarcely sinuate at the base; the margins broad, flat, and of a lighter reddish yellow, the anterior angles as in *E. Westwoodi*, the posterior less prominent. Elytra rounded laterally, rather pointed at the apex, an oblique boss on each side near the shoulders; each elytron has a small elevation or gibbosity about the middle of the length on the groove separating the disk and margin, and four black spots, two near the base, another large one about the middle near the suture, and a fourth behind and near the margin, the suture elevated. The disk of the elytra is strongly punctate, the margins are broad, flat, narrowing to the apex, impunctate, a little folded above on the border and of the same colour as the margin of the thorax. The undersurface of the body, the legs and the antennæ of a nitid brown.

Long.  $6\frac{1}{2}$  lines, lat. 5 lines.

*Hab.*—New South Wales.

In the Atlas to Lacordaire's Gen. Col. t. 55, fig. 3, a figure of what is called *Encephalus submaculatus* is given; it appears to me, however, to be undoubtedly intended to represent *Encara Lacordairei*, a species described further on. The mistake is readily accounted for. *Encara submaculatum* has long passed in most collections in Australia and elsewhere as *Encara Westwoodii*, and the name *Westwoodii* being thus appropriated, the only other species known in N. S. Wales was generally accepted as *E. submaculatum*. This insect is by no means common, though it has a wide range, being found over most parts of New South Wales; it is generally found on trees, or posts on warm sunny days. When first taken it is, as in the rest of the genus, covered with a whitish secretion, filamentous or powdery, but apparently never to the degree seen in a species from Queensland, *E. floccosum*, Pascoe, mentioned hereafter.

### 3. ENCARA BREMEI, Hope.

*Helæus Bremei*, Hope, Trans. Ent. Soc. London, 1846, Vol. V, p. 54. pl. VI. fig. 5.

Orbicular, testaceous brown, the antennae yellow. Thorax convex in the middle and dyed with a blacker colour. Elytra testaceous, subluteous, smooth, under a lens very densely punctulate. Body beneath of the same colour, legs pitchy red.

Long.  $6\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Swan River, W. Australia.

This is all the description given by the Rev. F. W. Hope of this insect, and I have never seen it myself, but I have little doubt that it has been rightly placed in this genus, even though its author seems to regard it as having affinity to the genus *Cilibe*.

#### 4. *ENCARA FLOCCOSUM*, Pascoe.

*Saragus floccosus*, Pascoe, Ann. Nat. Hist. 4th ser. Vol. V. p. 100.

"Broadly ovate, moderately convex, fulvous-testaceous, minutely punctulate; head small, eyes nearly contiguous; antennae ferruginous: prothorax short, very transverse, brownish-testaceous

5. *ENCARA LACORDAIREI*, n. sp.

Testaceous-brown, nitid, broadly ovate, the margins of the thorax and elytra of a paler hue. Head like that of *E. submaculatum* but not sunk so deeply in the thorax; thorax dark brown on the disk, slightly uneven on the surface, and not or scarcely sinuate on the base. The scutellum and base of thorax carinate. Elytra flat, coarsely and densely punctate, rounded behind, the surface rather uneven, suture slightly elevated, three costæ more or less of a dark brown colour on each elytron, the one next the suture most distinct and very crooked, the next scarcely traceable except towards the apex; the third very indistinct, and joined to the margins behind the middle by a wavy brown fascia; the humeral callus is also brown. The undersurface and legs are of a nitid brown, minutely punctate and pubescent.

Long.  $5\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Coast districts New South Wales.

This is a much rarer species than *E. submaculatum*. Mr. Masters has never observed it except in the Illawarra district, where it is found like the last species on the sunny side of trees.

Genus *PTEROHELEUS*, De Brême.

Head immersed in the thorax up to the insertion of the antennæ, slightly narrowed and broadly truncate or sinuate in front. Eyes more or less prolonged in front but not contiguous.

Antennæ as long or a little longer than the thorax, their four or five last joints nearly orbicular and forming an inconspicuous mass. Thorax very strongly transversal, parabolically rounded on the sides, broadly and strongly emarginate in front, contiguous to the elytra, and slightly bisinuate at the base, its foliaceous part moderately broad and flat. Elytra large, moderately convex, sometimes oblong, sometimes broadly oval, and in the first of these cases the foliaceous margin is narrow and raised; in the second it is large, as in the thorax. Legs long; tibiæ smooth, aciculate; one spur on the anterior and two very small ones on the four



posterior tibiæ. Metasternum long. Mesosternum horizontal and narrowed behind, declivous and semicircularly concave in front. The prosternal prominence flat, two-grooved, lanciform and declivous behind. Body oval or oblong, winged.

This genus is numerous in species, and seems to be pretty evenly distributed throughout Australia. They are flat insects, of pitchy or black colour, and are, I believe, invariably found under the loose bark of living Gum trees.

The species are not easily identified, and the difficulty is much increased by the doubt which exists as to the identity of some of the old typical insects described by Boisduval and De Brême. I find that in the Australian collections to which I have had access, the wrong names have been in many cases affixed to the wrong insects. The reason, no doubt, is that there are few entomologists here who have seen the Marquis De Brême's Monograph, and fewer still who can get access to Boisduval's "Faune de l'Océanie." I cannot say, however, that I regard the inaccessibility of Boisduval's work as a misfortune, for a worse

## SECTION I.

Species of broadly ovate form, and largely expanded margins to both thorax and elytra.

6. *PTEROHELAEUS WALKERI*, Brême.

Mon. des Cossyph. Part 1. p. 27, pl. II. fig. 4 ; Lac. Gen. Atl. t. 54, f. 3.

Nitid black, oval, slightly convex. Head faintly rugose, sub-transversal, the lateral angles of the epicranium raised and exserted, the clypeus slightly convex, and rounded on the sides, front depressed, antennæ about the length of the prothorax, that rounded, strongly transversal, smooth, somewhat sinuated posteriorly, with the margin broad and flat, its anterior angles rounded and reaching to half the length of the head. Elytra oval, slightly dilated posteriorly, very nitid, the humeral region raised into a knot, margins smooth, flat, as large as those of the thorax, but narrowing behind. The disk of the elytra has nine raised longitudinal ribs or lines, and in the interstices between these, two rows of small impressed punctures, both the punctures and ribs becoming almost obliterated towards the apex. Thighs dilated, the legs and under surface of the body of a nitid blackish-brown. Abdomen flattened, faintly longitudinally striated.

Long. 25, lat. 16 millim.

The above is a translation of De Brême's description of the species. There are other species so resembling it in form and sculpture, as to make a more detailed description very necessary, but I think it better to point out the distinctive features in the different species as I arrive at them. I may mention one peculiarity of all De Brême's descriptions, he invariably applies the term "disque" to the margins of the thorax and elytra ; this I have of course always corrected in my translations.

Found under the loose bark of gum trees in all parts of New South Wales.

7. *PTERHELÆUS CORNUTUS*, n. sp.

In form, size and sculpture like *P. Walkeri*, but differs in having the lateral angles of the epicranium more elevated and distinctly terminating in a tooth. The sculpture of the elytra also differs in having the double row of punctures in the interstices placed close on each side of the costæ, giving them a crenulated appearance, and with scarcely a trace of the intermediate costæ, which are just traceable in *P. Walkeri*. The thighs of this species are evidently more dilated than in *P. Walkeri*.

Long. 10 lines, lat. 8 lines.

*Hab.*—Wide Bay, Rockhampton.

8. *PTERHELÆUS BREMEI*, Macleay.

Trans. Ent. Soc. N.S. Wales, Vol. II., p. 281.

Broadly ovate, black, subopaque. Head large, sub-quadrate,

9. *PTEROHELEUS RIVERINÆ*, n. sp.

A species remarkably like *P. Walkeri*, but smaller, the clypeal suture more distinctly marked, the lateral angles of the head round and nearly flat, the eyes more apart, the thorax slightly less transverse, and the elytra more convex, more nitid and more strongly costate.

Long. 10 lines, lat.  $6\frac{1}{2}$  lines.

*Hab.*—Murrumbidgee.

In form and stature like *P. Walkeri*.

10. *PTEROHELEUS SPINICOLLIS*, n. sp.

Broadly ovate, black, moderately nitid. Head sub-opaque, very minutely punctate, the surface flat, the angles scarcely reflexed. Thorax also sub-opaque, very minutely punctate, transverse, very largely emarginate in front, the anterior angles advanced and spiniform, the margins very broad and smooth. Scutellum transverse, curvilinearly triangular, somewhat depressed at the base. Elytra each with 17 rows of strong punctures, the interstices for the most part slightly elevated, the fourth and eighth distinctly so, the margins broad, flat and smooth, and the sutural apex terminating in a dehiscent spine.

Long. 10 lines, lat. 8 lines.

*Hab.*—Endeavour River.

11. *PTEROHELEUS ACUTICOLLIS*, n. sp.

This species differs from *P. spinicollis* in being of less size, in having the anterior angles of the thorax acutely advanced but not spinigerous, and in the elytra not mucronate. The form and sculpture is in every respect the same.

Long. 8 lines, lat. 6 lines.

*Hab.*—Endeavour River.

12. *PTEROHELÆUS PICEUS*, Kirby.

*Helæus piceus*, Kirby, Trans. Ent. Soc. Lond. XII. 1818, p. 468.

*Pterohelæus piceus*, Brême, Mon. Cœsyph. 1842, p. 28, pl. II fig. 5.

Like *P. Walkeri* but smaller. Colour piceous-brown, nitid. Broadly oval; head scarcely visibly punctate, labrum prominent, sides of the epicranium a little raised; thorax strongly transversal, slightly convex, rounded on each side and smooth, almost straight at the base; the margin broad, slightly curved up at the border; the anterior angles reaching half the length of the head. Elytra slightly convex, oval, a boss or callus on the humeral region, margins smooth, as large as those of the thorax, equally concave and reddish coloured, and narrower towards the apex. On the disk of each elytron are numerous slightly elevated costæ (17) more distinct near

to the front of, the head before the eyes. Thorax with a broad flat margin, and a lightly marked median line. Scutellum curvilinearly triangular. Elytra broadly margined—the margin of a reddish hue, slightly enlarged towards the middle, narrow at the apex, and marked off from the disk by a row of strong punctures—and densely punctate in numerous rows, the punctures small and sub-obliterate, the interstices also sub-obliterate, but a few showing a more costiform appearance than the others. Body beneath sub-nitid, sub-striolate. Antennæ, palpi, and tarsi of a reddish brown.

Long. 9 lines, lat. 6 lines.

*Hab.*—Gayndah, Peak Downs.

This species is quite of the *P. piceus* type.

#### 14. PTEROHELEUS ARCANUS, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. V, 1870, p. 98.

“Broadly ovate, brownish pitchy, slightly nitid; head impunctate; the clypeus, marked off by a fine line, broad and rounded anteriorly; prothorax very short, deeply and narrowly emarginate at the apex, the middle of the disk with two conspicuous foveæ; scutellum transversely triangular; elytra moderately convex, with broad foliaceous margins raised and thickened at their edges, each elytron with a glossy elevated ridge or line near the suture, terminating posteriorly in a number of small granules, a series of about six more or less elevated longitudinal lines, dotted with granules, on the rest of the elytron, one of these between the suture, which is also marked by a similar line, and the ridge, the remainder, of which the second and fourth are the most prominent, externally, the intervals of the lines minutely punctured in two rows; body beneath and legs glossy chestnut-brown” (Pascoe).

Length, 9 lines.

*Hab.*—Port Denison, Cleveland Bay; (“under bark”).

I have specimens from Cleveland Bay not exceeding 7 lines in length.

15. *PTEROCHELEUS PRULINOSUS*, Pascoe.

Journ. of Ent. II. p. 461

"Allied to *P. piceus*, Kirby, but broader, and the sides more parallel, covered with a fine uniform whitish exudation, and, under the lens, a scattered greyish squamosity; elytra striate-punctate, with only three very slightly raised lines on each; body beneath reddish-chestnut; antennæ and legs ferruginous" (Pascoe).

Length, 9 lines.

*Hab.*—North Australia.

I have never seen this species.

16. *PTEROCHELEUS COSTATUS*, n.sp.

On the 17th of May, 1871, I received from Mr. J. H. ...

nearly contiguous. Thorax very transversal, the disk convex, the margins broad, and a little recurved, the sides narrowing much to the apex, and slightly bisinuate, the anterior angles round but prominent, the base slightly bisinuate. Scutellum transversal, rounded behind. Elytra moderately convex with broad flat lateral margins, the disk with 17 rows of distinct punctures on each elytron, the interstices scarcely raised and nearly equal, the fourth and eighth very slightly more raised near the base, also a raised callus near the shoulder and an inequality about the middle close to the margin. The undersurface and legs are piceous brown and nitid, the prosternum is rather sharply carinated along the entire length, the spurs on the extremity of the anterior tibiæ are short, stout and pointed.

Length, 9 lines, lat. 6 lines.

*Hab.*—Cape York.

18. *PTEROHELÆUS DARWINIENSIS*, n. sp.

Broadly ovate, convex, black, sub-nitid. Head very minutely punctate, flat at the lateral angles, broadly rounded in front, eyes rather distant. Thorax transverse, smooth, narrowly and deeply emarginate in front, receiving the head up to the eyes, the lateral margins moderately broad and thickened on the edges, moderately bisinuate on the base. Elytra rather broader than the thorax, narrowly margined, each elytron faintly costate, the 2nd, 4th and 6th most conspicuous, the intervals with a double row of punctures. Undersurface and legs nitid, the prosternum flat and roundly produced behind, the spur on the anterior tibiæ rather long and acute, and slightly curved.

Long. 8 lines, lat.  $5\frac{1}{2}$  lines.

*Hab.*—Port Darwin.

This species, though in form and sculpture resembling the insects of this section, shows also in the narrow margins of the elytra a decided affinity to those I place in the 2nd section.



19. *PTERHELÆUS INSULARIS*, De Brême.

Mon. Cossyph. 1, p. 30, pl. III., fig. 6.

Dull brownish-black, oval; head prominent, rounded, sub-convex, smooth. Thorax smooth, slightly convex, transverse, rounded on the sides, sinuate behind, the margin narrow, flat, the anterior angles not reaching the middle of the head, the posterior prominent and curved a little behind. Elytra oval, sinuate at the base, feebly narrowed towards the apex, slightly convex, with a number of slightly visible raised costæ, and between them two rows of punctures slightly impressed, the margins smooth, flat and as large as those of the thorax; suture smooth. Antennæ short, the last five joints large and flattened. Legs brown, nitid. Thighs dilated; undersurface and body of an opaque brown.

Long.  $7\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.* —Raffle's Bay, N. Australia.

strongly elevated from below the scutellar striola, the punctures rather small, the expanded margins, owing to a contraction of the sides of the disk, broadest at the middle, behind very distinctly reflected; body beneath and femora very glossy chestnut-brown; antennæ, tibiæ, tarsi, and epipleuræ of the elytra reddish ferruginous" (Pascoe).

• Length, 10 lines.

*Hab.*—Melbourne.

It is with some doubt that I place this and the two following species in this section. I have never seen any of them. They are described by Pascoe, as being intermediate between *P. Walkeri* and *P. silphoides* in form, but no indication is given of their relative length or breadth. I think they must approach very nearly to some of the insects grouped in the next section.

## 21. PTEROHELÆUS HEPATICUS, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. III. p. 285.

"Dark brown (or sometimes light reddish brown), paler at the margins, less glossy than the last; head rather narrow behind the antennary ridges; the clypeus very convex, its suture above indistinct, but forming a well marked groove on each side; the eyes widely apart; prothorax not broader than the elytra at their base, much longer and narrower than in the last, the basal foveæ represented by a large shallow depression on each side; scutellum transversely triangular, the sides curvilinear; elytra gradually narrowing from the base, the sides of the disk not contracted, seriate-punctate, the intervals of the rows not raised, the punctures rather small, the expanded margins of nearly equal breadth, or only very gradually narrowing behind, the suture raised as in the last; body beneath and legs glossy chestnut-brown; antennæ glossy ferruginous" (Pascoe).

Length,  $8\frac{1}{2}$  lines.

*Hab.*—Melbourne.

22. *PTERORHÆLEUS DISPAR*, Pascoe

Ann. Nat. Hist. Ser. 4, Vol. III. p. 286.

"Shortly elliptic in the male, oblong-obovate in the female, shining pitchy brown, the margins much paler; head rather narrow in front; clypeus convex, its suture rather indistinct, the eyes not remote; prothorax shorter proportionally in the male, the basal foveæ shallow, between them opposite to the scutellum an indistinct groove; scutellum triangular, elytra nearly parallel at the sides, and not broader than the prothorax in the female, broader in the middle in the male, finely seriate-punctate, the intervals without raised lines, the suture not elevated, the expanded margins of nearly equal breadth at the sides, and a little reflected at the edge; body beneath and femora dark chestnut-brown, shining; antennæ, tibiæ, and tarsi paler" (Pascoe).

Length (♂), 7 lines, (♀) 9 lines.

*Hab.*—Swan River.

almost truncate in front, with a narrow recurved margin. Thorax with a broad lateral margin a little reflexed at the anterior angles, and only slightly bisinuate at the base. Scutellum triangular, punctate. Elytra nitid on the disk, nearly twice as long as the width, narrowly and equally margined, and marked on each elytron with eight costiform crenulated elevations alternating with smaller ones some of which are scarcely traceable, with the intervals coarsely and profoundly punctate. Under surface nitid, rugosely striolate. Antennæ, palpi, and tarsi piceous, the spur of anterior tibia short and obtuse.

Long. 10 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Gayndah, Queensland.

#### 24. *PTEROHELEUS REICHEI*, Brême.

Mon. Cossyph. I. p. 35, pl. II. fig. 2.

Oblong, smooth, of a dull reddish-brown colour. Head prominent, finely punctate. Clypeus convex, the lateral angles prominent but rounded, the front convex. Thorax transverse, scarcely sinuate behind, convex, smooth, rounded on each side but very little sinuated at the anterior angles of the margins, those large, concave, with a very small and nitid border; the anterior angles about a third of the length of the head. Elytra convex laterally, depressed above, sub-parallel, rounded towards the apex, and a little pointed terminally; humeral regions scarcely prominent; on each elytron are numerous rather indistinctly raised costæ, becoming obliterated laterally and towards the apex; the intervals furnished with rows of profound punctures. The five last joints of the antennæ are round but a little flattened, velvety and of a testaceous-brown; undersurface of the body of a deep dull brown, the legs of a nitid brown.

Long. 10 lines, lat. 5 lines.

*Hab.*—New Holland.

I have never seen this species.

25. *PTERONELÆUS HIRTUS*, n. sp.

Oblong, black, sub-nitid, the upper surface rather thickly clothed with erect soft hairs. Head rugosely punctate, clypeus broadly rounded, smooth and slightly reflexed, eyes about their diameter apart. Thorax transverse, thinly punctate, the anterior angles produced and angularly rounded, the margins broad, thinly punctate, narrowly raised on the edge, and of a piceous colour, the posterior angles acute and slightly pointed backwards, the base bisinuate, with a transverse canal on the central lobe, and a deep fovea at the middle of the emarginate part on each side of it; the disk is moderately convex with the median line rather faintly marked, and a shallow groove marking the line of separation between the disk and the margin on each side. Scutellum slightly transverse, triangular, rounded behind. Elytra of the width of, and three times the length of the thorax, parallel-sided for two-

26. *PTEROHELÆUS ALTERNATUS*, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. III. p. 284.

“Rather narrowly oval, black, shining, somewhat depressed; head finely punctured; clypeus scarcely emarginate in front, its suture nearly obsolete; prothorax minutely punctured, a broad shallow fovea on each side at the base, no groove, the expanded margins not recurved; scutellum curvilinearly triangular; elytra flattish at the middle and base, finely seriate-punctate, the alternate intervals of the rows raised, the fourth, eighth, twelfth, and sixteenth much more so than the others, the expanded margins broad at the base, gradually narrower to the apex; body beneath and legs black, slightly glossy, tibiæ covered with short spinous hairs; antennæ short, not reaching to the end of the prothorax, black” (Pascoe).

Length, 8 lines

*Hab.*—Interior of Australia.

Unknown to me, apparently resembling the following species.

27. *PTEROHELÆUS DEPRESSIUSCULUS*, n. sp.

Oblong-oval, black, sub-nitid, sub-depressed. Head finely punctate, dull, clypeus slightly emarginate, clypeal suture distinct at the sides, depressed in the middle, a longitudinal impression on the forehead, eyes distant. Thorax rather dull, minutely punctate, the anterior angles reaching to the eyes, the margins broad and slightly concave, the base slightly bisinuate and profoundly bifoveate, the disk a little convex with the median line visible throughout. Scutellum triangular, the sides slightly rounded. Elytra very slightly broader than the thorax, and rather more than twice the length, nitid, parallel-sided and rounded towards the apex, seriate-punctate; the punctures disposed in close not very regular rows, and small, except near the sides when they become larger; the interstices four, eight, twelve, and sixteen, marked

with broad, smooth, slightly elevated costæ; the margins are narrow and reflected, a little broader and square at the shoulder, the sculpture becomes obsolete at the apex. The under surface is much striolated, the legs are rather slender, the tarsi long, the prosternum presents a prominent rounded keel along its whole length.

Long. 10 lines, lat.  $5\frac{1}{4}$  lines.

*Hab.*—South Australia.

28. *PTEROCHELEUS SQUALIDUS*, n. sp.

Of a very dull opaque-black, and densely covered with minute asperities all over. Form oblong, flat. Head flat, without clypeal suture, clypeus broadly emarginate, eyes well apart. Thorax transverse, semi-circularly emarginate in front, slightly bisinuate behind and with the lateral margins broad and a little reflected. Scutellum transverse and rounded behind. Elytra scarcely broader

rugosely punctate, the margins broad and flat. Elytra a little broader than the thorax and more than twice the length, with a number of close rows of deep square closely placed punctures, the interstices alternately larger and forming nodular costæ, the whole having a crenulate and chlathrate appearance. Body beneath nitid.

Long. 5 lines, lat.  $2\frac{1}{2}$  lines.

*Hab.*—Port Darwin.

#### SUB-SECTION II.

Elytra soriolate-punctate, the interstices granular.

#### 30. PTEROHELÆUS GUERINII, Brême.

Mon. Cossyph. I. p. 36, pl. II. fig. 3.

Oblong, dull, blackish brown; head very prominent; clypeus a little emarginate, front convex. Thorax very transverse, sinuate behind and rounded on the sides, convex and moderately punctate; the margins broad, a little turned up, of a less dull brown, the anterior angles reaching beyond the middle of the head. Elytra parallel-sided for two-thirds of the length, rounded posteriorly, the disk convex and punctate in serrated rows, towards the apex the interstices are furnished with some very small granules; the suture is smooth, the margins very narrow, with a small border.

Long.  $8\frac{1}{2}$  lines, lat.  $6\frac{1}{4}$  lines.

*Hab.*—Australia.

I have not, to my knowledge, seen this species. In Australian collections the name has been affixed to another and very different insect.

#### 31. PTEROHELÆUS GRANULATUS, Germar.

*Cilibe granulata*, Germ. Linn. Ent. Stettin. Band III., p. 197.

Near *P. peltatus*, Erichs., but longer. Head punctulate, black, the antennæ and palpi piceous. Thorax very minutely and



dispersedly punctate, black, the lateral margins dilated, scarcely reflected, smooth, piceous and more or less diaphanous. Elytra finely but densely striate-punctate, the alternate interstices finely and remotely seriate-granulate, the granules more or less elevated, in the large specimens for the most part less distinct, black, the lateral margins somewhat piceous and diaphanous. Body beneath blackish piceous, legs lighter.

Long.  $6\frac{1}{2}$ -7 lines, lat.  $3\frac{1}{2}$  and  $3\frac{3}{4}$  lines.

*Hab.*—South Australia.

32. *PTEROHELÆUS TRISTIS*, Germar.

*Cilibe tristis*, Germ. Linn. Ent. Stettin. Band 3, p. 197.

Entirely black, subnitid, the tarsi somewhat piceous. Head densely punctate, thorax densely and very finely punctate, the punctures rather large and scattered, the sides broadly flattened, sub-elevated and finely transversely striolate. Elytra profoundly and densely seriate-punctate, the marginal stria

34. *PTEROHELÆUS GRANULIGER*, n. sp.

Oblong-ovate, black, sub-nitid, sub-depressed. Head finely punctate, clypeus broad, slightly convex, clypeal suture a little depressed and not marked in the middle, eyes rather distant. Thorax finely punctate, rather opaque, the anterior angles advanced, reaching to the front of the eyes, margins broad and slightly rugose, the base bisinuate, its central lobe slightly reflected on the margin. Elytra of the width of the thorax, and three times the length, parallel-sided to near the apex, seriate-punctate in 17 rows, the punctures deep and of moderate size, the interstices a little raised (the fourth and eighth very slightly more than the others) and all rather closely studded with bright bead-like granules; the margins are very narrow, concave, thinly punctate, and a little reflected at the humeral angles. Body beneath nitid and striolate; legs nitid and rather long and slight; prosternum broad and four-grooved between the legs, terminating behind in a flat triangular extension.

Long.  $10\frac{1}{2}$  lines, lat.  $5\frac{1}{2}$  lines.

*Hab.*—Murrumbidgee

35. *PTEROHELÆUS SUBGEMINATUS*, n. sp.

Oblong-oval, black, sub-opaque. Head very minutely punctate, plain, without clypeal suture. Clypeus a little swollen in front, that and the labrum slightly emarginate, eyes distant. Thorax transverse, very minutely but not densely punctate, the anterior angles not produced, the apex slightly emarginate, the lateral margins rather broad, concave and of a reddish colour, the base bisinuate. Elytra scarcely broader than the thorax, and three times the length, with about 17 crowded rows of minute punctures, disposed somewhat in pairs, the interstices perfectly flat and furnished near the apex with some minute granules, the margins very narrow and recurved. Body beneath and legs reddish, nitid,

finely striolate, the thighs are short and compressed, the tibiae and tarsi long and slender. The last five joints of the antennae broad and compressed.

Long. 4 lines, lat 2 lines.

*Hab.*—Port Augusta, S. Australia (Mr. Masters' Collection).

36. *PTERONELÆUS NITIDIUSCULUS*, n. sp.

Oblong-oval, black, nitid, of depressed form. Head very minutely punctate, clypeus slightly emarginate and thickened and convex in front, eyes distant. Thorax transverse, deeply emarginate in front, the anterior angles reaching as far as the front of the eyes, the margins broad, concave, turned up on the edge, and of a reddish hue, the base lightly bisinuate, the disk very lightly and shallowly foveate at the base and extremely minutely punctate. Elytra scarcely broader than the thorax, and nearly three times the length, parallel-sided to near the apex, very nitid, closely and densely seriate-punctate (17 or more rows of minute punctures). the interstices not raised, and furnished with glossy

Brown, smooth, ovate; antennæ rather long, brown, the last joints flattened, the terminal one oval; head punctate, narrowed at the anterior angles, labrum porrect, narrow, clypeus convex, anterior angles of the epicranium rounded but prominent and slightly raised. Thorax scarcely visibly punctate, opaque, sinuate behind, margins broad, flat, the borders folded upwards, the anterior angles reaching the middle of the head, the posterior curved backwards; an oblique "sillon" at base between the disk and the margin. Elytra oval, opaque, very feebly dilated towards the middle, and pointed posteriorly, sinuate at the base, where they are less convex than towards the apex, they have numerous series of large impressed punctures.

Long.  $7\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Australia.

I believe I have never seen this species, it is clearly not the *O. silphoides* of Boisd, which may be a *Cilibe*; De Brême placed this insect in the genus *Cilibe*, but Pascoe (1) asserts positively that it is winged.

### 38. PTEROHELEUS SERVUS, Pascoe.

Journ. of Ent. Vol. II. p. 462.

"Oblong, dull brown, narrower than *C. silphoides*, DeBrême with the prothorax a little wider than the elytra, its apex more deeply and squarely emarginate, not semi-circular, and the narrowly impressed line in the middle more strongly marked; elytra striato-punctate, the striæ approximate; body beneath and legs glossy chestnut-brown; sides of the abdominal segments wrinkled" (Pascoe).

Length, 7 lines

*Hab.*—Victoria.

### 39. PTEROHELEUS MEMNONIUS, Pascoe.

Journ. of Ent. Vol. II. p. 462.

"Oblong, glabrous, black, slightly nitid; head finely punctured, narrowed; the eyes large and sub-approximate, the distance

---

(1) Journ. Ent. Vol. II. p. 462, Note.

between them in front being rather more than the length of their shortest diameter; prothorax finely punctured, its margins minutely waved, elytra closely lineate-punctate, the punctures well-marked the margins very narrow; body beneath and legs black, shining, tarsi and lip with ferruginous hairs" (Pascoe).

Length, 11 lines.

*Hab.*—South Australia.

40. *PTEROMELÆUS PUSILLUS*, MacI.

Proc. Linn. Soc. N. S. Wales, Ser. 2, Vol. II. p. 307.

*Hab.*—Barron River, N. Queensland.

41. *PTEROMELÆUS NITIDISSIMUS*, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. III. 1869, p. 282; *P. striato-*

42. *PTEROHELÆUS VICARIUS*, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. III. 1869, p. 283.

“Rather broadly oval, brownish-black, shining; head thickly and roughly punctured, clypeal groove well defined, narrowly and sharply limited, the transverse portion above curved downwards; prothorax minutely but not very closely punctured, rounded at the sides, the expanded margins not recurved, the irregular basal groove on each side nearly obsolete; scutellum broadly triangular, its apex rounded; elytra a little contracted behind the shoulders, finely, but not minutely, seriate-punctate, the punctures less regularly arranged near the suture and base; body beneath and legs glossy brownish-black, the propectus opaque, granulate; antennæ short, third joint nearly twice as long as the fourth” (Pascoe).

Length, 6-7 lines.

*Hab.*—New South Wales, Victoria, and Queensland.

43. *PTEROHELÆUS LITIGIOSUS*, Pascoe.

Ann. Nat. Hist. 4 Ser. Vol. III. p. 283.

“Rather narrowly oval, rusty-brown, shining; head finely punctured, a little concave in front; clypeus broadly emarginate anteriorly, separated from the front by a narrow indistinct line; prothorax very minutely punctured, a short longitudinal groove near the apex, none at the base, the expanded margins not recurved; scutellum transversely triangular; elytra callous at the base, rather finely seriate-punctate, the intervals of the rows slightly raised, the fourth and eighth intervals rather more so than the others, the expanded margins narrow; body beneath, legs, antennæ, and margins of the prothorax and elytra reddish-ferruginous” (Pascoe).

Length, 7 lines.

*Hab.*—Sydney,

44. *PTEROMELÆUS ASELLUS*, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. V, 1870, p. 99.

"Oval, the outline equally rounded and rather obtuse at both extremities, the sides a little incurved, moderately convex, blackish-brown, scarcely shining; head and prothorax covered with exceedingly minute punctures, the margins of the latter gradually passing into the disk; scutellum transversely and curvilinearly triangular; elytra linearly punctured, the punctures rather small, the fifth and eighth intervals between the lines a little broader than the rest, and the margins concolorous, narrow, of equal breadth throughout, and agreeing with those of the prothorax; body beneath and legs glossy-brown; antennæ short, the last joint nearly circular" (Pascoe).

Length,  $4\frac{1}{2}$ -5 lines.

*Hab.*—Queensland.

prominent. Thorax moderately transverse, not sinuate behind, finely punctate, convex, and rounded laterally; margins broad and wrinkled, punctate and of a less deep brown; the anterior angles extending a little beyond the half of the head. Elytra convex, parallel, somewhat feebly compressed at the humeral region (which is also raised into a boss), rounded behind, strongly punctate (these impressed punctures are disposed in very close lines); the margins very narrow, but quite visible and turned up. Antennæ fulvous, velvety; legs and undersurface of body; deep shiny-brown.

Long. 7 lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—Swan River.

47. *PTEROHELÆUS OVULUM*, Haag-Rut.

Journ. Mus. Godef. Heft 14, p. 115, taf. 7, fig. 1—Verh. Ver. für naturw. Unterh. in Hamburg, III. p. 97.

Regularly oval, blackish brown, opaque; head dispersedly punctate; thorax scarcely punctate, three times broader than long, much narrowed in front; elytra broader than the thorax, little convex, the margins flattened out, with the suture and eight costæ slightly elevated, and the intervals regularly punctate. Body beneath rather nitid, sparingly punctulate and striolate.

Long.  $6\frac{1}{2}$ -7 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Gayndah, Queensland.

This species is found over a great part of North Queensland. It is not unlikely that there are more than one species of the type

48. *PTEROHELÆUS CONFUSUS*, Macleay.

Trans. Ent. Soc. N. S. Wales, Vol. II., p. 283.

Ovate, black, sub-nitid. Head a little widened and elevated in front of the eyes, and scarcely emarginate in front, with the central canaliculation minute, the semicircular clypeal suture well marked, and a transverse raised line near the apex of the clypeus.



Thorax sub-convex, with a broad reddish reflexed margin, and the median line scarcely traceable. Scutellum transversely and curvilinearly triangular. Elytra sub-convex, the lateral margins reddish, nearly as broad as those of the thorax at the humeral angles, and becoming narrower to the apex, with the disk covered with numerous rows of small punctures, becoming obliterated towards the apex, the alternate interstices faintly costate and quite obliterated behind. Under side of body nitid, striolata. Legs piceous, antennæ and tarsi reddish.

Long. 7 lines, lat. 4 lines.

*Hab.*—Gayndah.

49. *PTEROHELEUS PUNCTIPENNIS*. n. sp.

Ovate, moderately convex, black, nitid. Head punctate, immersed in the thorax up to the anterior angles, eyes moderately distant. Thorax more than twice broader than the length, minutely punctate, very deeply emarginate in front, slightly bisinuate behind, with the margins very broad and finely marginal.

length, with narrow reflected lateral margins, the disk densely punctate in numerous close striæ, the punctures deep, close and somewhat square, the interstices a little raised and very narrow. Body beneath piceous, nitid. Sterna coarsely punctate.

Length, 3 lines, lat. 2 lines.

*Hab.*—Clyde River.

51. *PTEROHELÆUS PELTATUS*, Erichs.

*Cilibe peltata*, Erichs. Archiv für Naturg. Jahrg. VIII, Bd. I, p. 175.

Oblong-oval, sub-depressed, piceous, sub-opaque. Head impunctate, clypeus dilated, truncate at the apex. Thorax lightly bisinuate at the base, twice as broad at the base as the length, the sides rounded, the apex deeply emarginate, impunctate, slightly convex on the disk, the margins broadly flattened, obscurely red, and reflected on the edge. Elytra slightly convex, densely seriate-punctate with two of the interstices slightly raised, the margins broad, smooth, and obscurely reddish.

Length, 5-5½ lines.

*Hab.*—Tasmania, Victoria.

52. *PTEROHELÆUS CEREUS*, n. sp.

Broadly ovate, black, nitid, of a waxy gloss. Head rugosely punctate, the clypeus slightly reflected in front, the lateral angles more so. Thorax very transverse, much narrowed and emarginate in front, bisinuate behind, minutely punctate on the disk and margins, the disk rather convex, with the median line showing on the anterior half, the margins broad and reflected in front, broader and flat towards the posterior angles. Elytra rather broader than the thorax, disk rather convex, and covered with tolerably regular close rows of smallish punctures, the margins tolerably wide, widest a little behind the shoulders, then narrowing to the apex, and transversely rugose.

Long. 6 lines, lat. 3½ lines.

*Hab.*—West Australia.

53. *PTERHELÆUS STRIATO-PUNCTATUS*, Boisd.

*Cilibe striato-punctata*, Boisd. Faun. de l'Océanie; Ericha. p. 266.

Elongate, oval, black. Thorax smooth, elytra elongate and covered with medium-sized punctures arranged in striae.

*Hab.*—Kangaroo Island.

I have not to my knowledge seen this insect, and M. Boisduval's description, which I have translated in full, is of very little use. I place it here because I see that Mr. Pascoe recognises it as a species.

54. *PTERHELÆUS PELTOIDES*, n. sp.

? *P. peltatus*, De Brême, Mon. Cossyph. I. p. 34, pl. II. fig. 4.

Oblong-oval, black, opaque. Head minutely punctate, clypeus a little convex or tumid, broadly truncate or very slightly emarginate; the lateral angles of the head rounded, prominent, and very

## SUB-SECTION IV.

Elytra irregularly punctate.

55. *PTEROHELÆUS KOLLARI*, Brême.

Mon. Cossyph. Vol. I. p. 32, pl. VII. fig. 3.

Nitid brown, smooth, very convex; head broad, prominent, strongly punctate; thorax notably transverse, sinuate behind, rounded laterally and very finely punctate, the margins narrow, flat and smooth, the anterior angles scarcely reaching half of the head, the posterior angles prominent and acute. Elytra sinuate at their base, parallel-sided for two-thirds of their length, rounded towards the apex, and a little pointed; the disk nitid, very convex and finely and irregularly punctate, the margins scarcely noticeable. Body beneath nitid brownish-black.

Long. 7 lines, lat.  $4\frac{1}{2}$  lines

*Hab.*—Swan River.

56. *PTEROHELÆUS GLABER*, n. sp.

Ovate, black, nitid, convex. Head rugosely punctate, deeply immersed in the thorax, the lateral angles raised. Thorax twice as broad as long, very finely punctate, the margins rather broad, minutely rugosely-punctate, and much reflected, especially at the anterior angles, the posterior angles pointed backwards. Scutellum curvilinearly triangular, with a few small punctures. Elytra of the width of the thorax and three times the length, convex, parallel-sided, covered with minute rather thinly distributed punctures scarcely showing a trace of order or striation, the margins narrow, concave, with a reflected edge, a slight compression on the side of the disk behind the shoulders, not showing on the margin. Undersurface nitid and slightly striolate, prosternum granulose, carinate from the apex.

Long. 7 lines, lat  $3\frac{1}{2}$  lines.

*Hab.*—Darling River.

57. *PTEROHRLÆUS MINIMUS*, Pascoe.

Ann. Nat. Hist. ser. 4, Vol. III., p. 284.

"Oblong-oval, pitchy brown, sub-nitid, the margins of the prothorax and the elytra, and the anterior part of the head, paler, yellowish brown; head densely punctured, the clypeal groove very indistinct; prothorax rather short, covered with fine oblong punctures, the intervals very narrow, and in certain lights causing the surface to assume a delicately corrugated appearance, the expended margins narrow and slightly reflected; scutellum transversely triangular; elytra minutely and irregularly punctured, with scattered minute tubercles, especially near the suture, the expended margins very narrow, body beneath and legs glossy reddish testaceous; antennæ inclining to testaceous" (Pascoe).

Length,  $3\frac{1}{2}$  lines.

*Hab.* —Cooper's Creek.

59. *PTEROHELÆUS DISPERSUS*, n. sp.

Oblong-oval, black, sub-opaque, rather depressed. Head roughly punctate, the clypeal suture distinct at the sides, the apex truncate. Thorax transverse, very thinly and minutely punctate; very broadly margined, the margins reflected in front, and bisinuate behind, with two deep foveæ in the centre of the disk. Elytra not broader than the thorax, irregularly and thinly punctate, the punctures rather small and disappearing towards the apex, the lateral margins narrow and smooth, a shallow fovea on the inner side of each humeral callus. Body beneath very nitid and finely striolate.

Long.  $5\frac{1}{2}$  lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—Lower Murrumbidgee.

60. *PTEROHELÆUS CONVEXIUSCULUS*, n. sp.

Ovate, black, sub-nitid, convex. Head rugosely punctate, the clypeal suture well marked, the apex broadly and very slightly emarginate, the lateral angles a little prominent and reflected. Thorax scarcely punctate, the median line rather faintly marked, the margins broad, flat and faintly striolate. Elytra of the width of the thorax; parallel-sided and convex, punctured irregularly as in the preceding species but more densely, with two large foveæ at the base. Body beneath nitid, the prosternum carinate from the apex.

Long. 7 lines, lat. 4 lines.

*Hab.*—Murrumbidgee.

61. *PTEROHELÆUS THYMALOIDES*, Pascoe.

*Saragus thymaloides*, Pascoe, MS.

Ovate, reddish-brown, sub-nitid, very convex. Head very minutely punctate, a small fovea in the middle of the vertex, the clypeus truncate with rounded angles and a slightly recurved

border. Thorax narrow in front, broad and nearly truncate behind, very minutely punctate, the margins expanded, not reflexed. Elytra broader than the thorax and not much longer than broad, convex, faintly and confusedly striate, and densely rugose-punctate all over, the margins narrow, almost disappearing towards the apex. The under surface and legs brown, nitid and striolate.

Long. 3 lines, lat. 2 lines.

*Hab.*—South Australia.

I received the name of this insect from Mr. Pascoe, years ago, but I cannot find that he ever described it.

I have now, I think, recapitulated all the known species of *Pterohelaeus* with the exception of *P. planus* of Blissington\* of which species I have never seen a description. I have also added largely to the number of new species, but I believe there are many yet remaining to be described.

The remaining genera of the Helaeidae, *Helaeus*, *Sympetris* and

DESCRIPTION OF TWO NEW SPECIES OF MARSUPIALS (*PERAMELES* AND *ANTECHINUS*), AND OF A NEW SPECIES OF *MUS* (*M. BURTONI*), FROM THE NEIGHBOURHOOD OF DERBY, N.W.A.

BY DR. E. P. RAMSAY, F.R.S.E., F.G.S., &c., &c.

(PLATE XVII.)

For the pleasure of describing the above-named Marsupials, I am indebted to the Hon. W. Macleay, who obtained them from one of his collectors (Mr. Froggatt), from Derby, N. W. Australia. The *Mus* I received from the late Thos. Boyer-Bower Esq., from the same locality.

*PERAMELES AURATUS*, *sp. nov.*

Total length, 8·5 inches (*without tail*); fore foot, 1 inch; hind foot, 2 inches; from tip of snout to centre of the eye, 1·4 inch; from tip of snout to base of the ear, 2·2 inches; length of ear 0·7 inch, width at base 0·5 inch, greatest width 0·7 inch; tail wanting, (*represented by small tubercle 0·5 inch long, probably a malformation.*)

General color rich golden brown pencilled with black, on the sides of a clearer tint, passing on the throat and belly into white. The whole of the upper surface of the body, head and sides pencilled with narrow black lines formed by the black portions of the stiff flattened hairs. Hair of two kinds, the fur next the skin is of an ashy white, soft and silky; the outer hairs flattened, stiff, almost spiny; on the throat, belly, and inner parts of the legs white; on the upper parts of head and back black and rufous; some hairs barred alternately, others all black or all rufous, giving a pencilled or striated appearance of black and rufous to the upper surface; the ears proportionately broad and short, although conspicuous. There is no trace of bars on the body. Incisors,  $\frac{5-4}{3-3}$ ; Canines,  $\frac{1-1}{1-1}$ ; Premolars,  $\frac{3-3}{3-3}$ ; Molars,  $\frac{4-4}{4-4}$ .



*ANTECHINUS (Podabrus) FROGGATTI, sp. nov.*

Tail thickened at the base, spindle-formed, gradually tapering to the tip. Total length to the root of the tail from the snout, 3 inches; from the snout to eye, 0.5 inch; from tip of snout to the ear, 0.8 inch; length of ear 0.4 inch, breadth at base 0.3 inch; fore feet from wrist with nails, 0.3 inch; hind feet with nails, 0.55 inch; greatest diameter of tail about one fourth of an inch from the rump 0.2 inch, its entire length 2.7 inches; fur dull mouse-color next the skin.

General color above light ashy-grey pencilled with black hairs, alternately banded or tipped with ashy-grey and black; sides of the head ashy tinged with brown; forehead and a narrow triangular stripe to the nose pencilled with black like the back; hair behind the ear ashy, round the base tinged with tawny rufous; ears ashy.

**MUS BURTONI, *sp. nov.***

(Plate XVII.)

General color of a uniform dull ashy-grey or mouse-colour, fur dense, close, thick and soft, of one kind, almost woolly, slightly browner above than on the under surface, which is of a light grey tint ; head rather short ; ears moderate ; tail naked, not quite the length of the body ; whiskers black reaching to behind the ears ; from snout to eye, 0·7 inch ; from snout to ear, 1·2 inches ; length of ear 0·65 inch, greatest width 0·45 inch ; forearm, 0·7 ; hand, 0·45 ; hind foot, 1 inch ; tail, 4·1 inches ; total length from snout to tip of tail, 8·9 inches.

The chief characteristic in this species is its remarkably woolly and soft fur, and uniform colour. The skull being broken and only the anterior parts with a portion of the dentition being left I can make no notes thereon ; the very accurate figures, however, will help in its identification. I have named this species after Mr. Burton who accompanied the late Thos. Boyer-Bower, Esq., as taxidermist to North West Australia.

DESCRIPTIONS OF THE EGGS OF TWO SPECIES OF  
AUSTRALIAN BIRDS.

By A. J. NORTH.

No. 1. MELANODRYAS PICATA, *Gould*.

This bird has a wide range over the Continent of Australia, specimens having been procured together with the nest and eggs by Mr. James Ramsay in October, 1876 near Bourke, New South Wales; and last year both Mr. Cairn and the late Mr. T. H. Boyer-Bower obtained several specimens about 80 miles inland from Derby, North-Western Australia. The nest is a small shallow

minutely spotted with light brown, together with a few faint blotches here and there of purplish-brown, the smaller end being entirely devoid of markings. Whether this is the normal colour of the egg is yet to be proved, as the egg being dropped by the bird when wounded, and the markings very faint, it is probable that it may not have been quite ready for laying. Long diameter 1·4 inch, short diameter 1·05 inch. (*From the Aus. Mus. Coll.*)

A photograph of this egg, sent by Dr. Geo. Bennett, F.Z.S., of Sydney, was exhibited at the June meeting of the Zoological Society of London, 1873. See P.Z.S., 1873, p. 519.

## NOTES AND EXHIBITS.

Mr. Maiden exhibited specimens of the Sago and Tobacco referred to in his paper, together with a specimen of the New South Wales *Nicotiana suaveolens* for comparison. Photographs taken by Mr. Devan, shewing the method of preparing the sago, were also shown.

Dr. Katz exhibited pieces of a Ham in which were found scattered small white, irregularly shaped nodules consisting of carbonate of lime. Microscopic examination revealed nothing of the existence of parasites at these spots. It was not improbable that these calcareous deposits had originated from the presence of a kind of vegetable micro-organism (*Actinomyces*), which has lately been described by Dunker and Hertwig, and which is said to occur frequently in certain muscles of the pig, where it forms small whitish corpuscles. It gives rise to pathological changes in the flesh affected, so as to make it unfit for

The President exhibited a Fairy Stone, or siderite concretion, of a singularly artificial appearance, which was probably due to the axis of the concretion being perpendicular to the plane of stratification of the shale in which it had been formed.

Also a rude Stone Axe or Mogo from the lower Namoi, the material of which was a kind of Quartzite formed partly of rounded and transparent sand grains, and partly of angular quartz. It appeared to have been formed by the deposit of siliceous matter in a bed of river sand by the percolating water of a hot spring.

Mr. Fletcher exhibited a small collection of plants collected by Mr. Froggatt at Derby, N. W. Australia.

Mr. North exhibited the eggs described in his paper.

Mr. Masters exhibited a collection of Insects from Derby, King's Sound, made by Mr. Froggatt in May last. Of Coleoptera there were 240 species, more than half of them new, but, with very few exceptions, of typical Australian genera. Small *Cara-bidæ* were numerous, but *Buprestidæ*, *Cetoniidæ* and other anthophilous beetles were very few.

He also exhibited from the same collection some Orthoptera, Hemiptera and Homoptera of peculiar form and appearance.

**WEDNESDAY, 28<sup>TH</sup> SEPTEMBER, 1887.**

---

**The Vice-President, Dr. J. C. Cox, F.L.S., in the Chair.**


---

**Mr. J. C. Neill was present as a visitor.**

---

**MEMBER ELECTED.**

**The Rev. Robert Collic, F.L.S., was elected a Member of the**



## DONATIONS.

"Proceedings of the Zoological Society of London for the year 1887." Part I. *From the Society.*

"Mittheilungen aus der Zoologischen Station zu Neapel." Band VII., Heft 2 (1887). *From the Director.*

"Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CIV., Nos. 24 and 25 (1887). *From the Academy.*

"Diagnoses d'Espèces Nouvelles et Catalogue des Espèces Françaises de la Tribu des Armadilliens, (Crustacés Isopodes Terrestres)" par Adrien Dollfus. *From the Author.*

"Transactions and Proceedings of the New Zealand Institute, 1886." Vol. XIX. *From the Institute.*

"The Victorian Naturalist." Vol. IV., No. 5 (September, 1887). *From the Field Naturalists' Club of Victoria.*

"Zoologischer Anzeiger." X Jahrg., Nos. 257, 258 (1887). *From the Editor.*

"Descriptions of some new Queensland Plants." By F. M. Bailey, F.L.S., &c. *From the Author.*

"Revue Coloniale Internationale." Tome V., No. 2 (August, 1887). *De la part de l'Association Coloniale Néerlandaise à Amsterdam.*

"Feuille des Jeunes Naturalistes." No. 202 (August, 1887). *From the Editor.*

Nomenclature of Japanese Plants in Latin, Japanese, and Chinese; (Nippon Shokubutsumeii"). By J. Matsumura. *From the Rev. J. E. Tenison-Woods, F.G.S., &c.*

"Woods and Forests of Tasmania—Annual Report, 1886-7." By George S. Perrin, F.L.S., Conservator of Forests. *From the Conservator of Forests.*



"Bulletins du Comité Géologique, St. Pétersbourg, 1887." Tome VI., Nos. 6 and 7 ;" "Supplément au Tome VI. des Bulletins du Comité Géologique," (1887) ; "Mémoires du Comité Géologique." Tome IV., No. 1 (1887). *De la part du Comité.*

"Bulletin de la Société Royale de Botanique de Belgique. Tome XXVI., Fasc. 1 (1887). *From the Society.*

"Journal of the Royal Microscopical Society, 1887." Part 4 (August). *From the Society.*

"The Scottish Geographical Magazine." Vol. III., No. 8 (August, 1887). *From the Hon. W. Macleay, F.L.S.*

"Bulletin de la Société Belge de Microscopie." 13me. Année No. VIII. *From the Society.*

"Register of Papers published in "The Tasmanian Journal" and the Papers and Proceedings of the Royal Society of Tasmania, from the year 1841 to 1885." Compiled by Alexander Morton, Assistant Secretary and Librarian. *From the Society.*

PAPERS READ.

DESCRIPTIONS OF NEW AUSTRALIAN FISHES.

By E. P. RAMSAY, F.R.S.E., &c., AND J. DOUGLAS OGILBY.

(*Notes from the Australian Museum*).

OPISTHOGNATHUS INORNATUS, sp. nov.

B. vi. : D. 12/16 : A. 2/14 : V. 1/5 : P. 21 : C. 14.

Length of head 3, of caudal fin 5, height of body  $4\frac{1}{2}$  in the total length. *Eye*—diameter  $3\frac{1}{4}$  in length of head,  $\frac{1}{2}$  a diameter from the end of snout, and  $\frac{1}{4}$  of a diameter apart. Greatest width of head equals  $\frac{5}{8}$  of its length. The maxilla is dilated and rounded posteriorly, it does not quite reach to the preopercular angle, and is  $\frac{2}{3}$  of the length of head. Opercles with two weak spines. *Teeth*—jaws with an outer row of strong curved teeth : behind these in the upper jaw is a band of similar but much smaller teeth, the inner row being slightly the largest, while the small teeth extend back in a gradually narrowing band as far as the enlarged outer row : in the lower jaw the inner band only extends a short way on each side of the symphysis, and its inner row is almost as well developed as the outer. *Fins*—dorsal spines weak ; the posterior rays about twice the height of the highest spine. Pectoral fin  $\frac{3}{7}$ , ventral  $\frac{4}{7}$  of the length of the head. *Scales*—very small. The lateral line ceases beneath the ninth dorsal ray. *Colors*—uniform brown.

We received two examples of this species from Derby, whence they were brought by Mr. C. Lees. Their respective measurements are  $9\frac{3}{4}$  and 11 inches. Register numbers, L. 841,-2.

COSSYPHUS BELLIS, sp. nov.

B. vi : D. 12/11 : A. 3/12 : V. 1/5 : P. 17 : C. 14 : L. lat. 32. L. tr. 5/13.

Length of head  $3\frac{1}{2}$ , of caudal fin  $5\frac{1}{2}$ , height of body  $3\frac{2}{3}$  in the total length. *Eye*—Diameter  $4\frac{1}{2}$  in the length of the head,  $1\frac{1}{2}$  in

that of the snout, and  $1\frac{1}{2}$  apart. The greatest height of the head is equal to its length without the snout. The maxilla extends to the vertical from the anterior margin of the orbit. *Teeth*—Both jaws are armed anteriorly with two pairs of canines, the inner pair of the lower jaw being much smaller than the outer, while the corresponding pair in the upper jaw are rather larger. A lateral row of strong compressed subulate teeth, inside of which are several irregular rows of minute granulose teeth. A posterior canine. The vertical limb and angle of the preopercle finely serrated. *Fins*—Dorsal spines strong, the last the longest,  $\frac{2}{3}$  of the length of the head; the rays (5-8) much longer than the spines. The third anal spine slightly longer than the twelfth dorsal; all three very strong. Pectoral fin rounded posteriorly,  $\frac{2}{3}$  of the length of the head, ventrals shorter than the pectorals, none of the rays produced; caudal emarginate. *Scales*—Six rows on the opercles, seven on the cheeks. *Colors*—Pale red on the back and sides, yellowish below; each scale with a darker longitudinal mark forming narrow bands along the sides; two broader

prominent point. *Teeth*—upper jaw with two pairs of strong barbed anterior canines, and eight sharp compressed teeth in each ramus; twelve similar teeth in the lower jaw, those immediately behind the first pair being much smaller than the posterior ones: a band of minute teeth on the palatines. *Fins*—the dorsal commences above the preopercle; its greatest height is equal to the distance between its base and the lateral line: pectoral short, obliquely truncate behind, rather less than  $\frac{1}{3}$  of the length of head. The free portion of the tail exactly equals the length of the head. The distance between the snout and the anus is  $\frac{4}{11}$  of the total length. *Colors*—silvery: a black blotch between 1st and 4th dorsal rays; the outer half of the dorsal fin dark grey throughout its entire length. Pectoral fins blackish, except near the base. Inside of mouth black. Irides silvery.

We are indebted to Dr. James Cox for the specimen above described, which was sent to him from Broken Bay, during the month of July last, and measured  $37\frac{1}{2}$  inches. Register number, I. 1342.

NEOPEMPHERIS PECTORALIS, sp. nov.

B. vi.: D.  $4/17$ : A.  $3/26$ : V.  $1/5$ : P. 17: C. 17: L. 1. 74: L. tr.  $11/10$ .\*

Length of head  $5\frac{3}{5}$ , of caudal fin  $4\frac{3}{5}$ , height of body  $3\frac{5}{6}$  in the total length. *Eye*—diameter  $3\frac{8}{9}$  in the length of the head, with well developed adipose lids, the posterior of which passes beyond the edge of the iris, while the anterior does not quite reach it; snout obtuse, about  $\frac{7}{8}$  of the diameter of the eye, and a trifle less than the interorbital space, which is slightly convex, as is also the upper profile of the head. The greatest width of the head equals  $\frac{5}{6}$  of its length, and its height is but little less than the same. The maxilla reaches considerably beyond the hinder margin of the eye, and is concealed beneath the preorbital during the anterior three-fifths of its length, the posterior two-fifths being falciform. Preopercular angle slightly produced; the lower limb feebly serrated. *Teeth*—both jaws with numerous rows of

---

\* Counted from origin of dorsal fin to base of anal.

small cardiform teeth, which are of equal size in the upper jaw, but in the lower increase in size from without, the inner row being much the strongest and inclined backwards: vomer, palate, and tongue with patches of villiform teeth. *Fins*—the dorsal commences much nearer to the base of the caudal than to the tip of the snout; its anterior rays are highest, but little shorter than the head, the last seven rays of about equal length, giving a deeply concave appearance to the outer edge of the fin: the anterior anal rays are half the length of the base of the fin, which commences in front of the origin of the dorsal: ventrals short, reaching half-way to the origin of the anal; an elongate pointed scale at the outside of the base, and a single similar scale between them: pectoral rather shorter than the head, reaching to the vertical from the 24th scale of the lateral line; its posterior margin slightly concave; caudal deeply emarginate. *Scales*—rather small, finely ctenoid, and firmly adherent; entire head, except a small patch on the snout, covered with scales; dorsal, anal, and

## FLOWERING SEASONS OF AUSTRALIAN PLANTS.

BY E. HAVILAND, F.L.S.

No. 7.—LIST OF PLANTS FLOWERING IN THE NEIGHBOURHOOD OF SYDNEY DURING THE MONTHS OF JANUARY, FEBRUARY, AND MARCH, IN ADDITION TO THOSE ENUMERATED IN FORMER LISTS.

### JANUARY.

#### Menispermæ—

*Stephania hernandifolia*

#### Pittosporæ—

*Bursaria spinosa*

#### Droseraceæ—

*Drosera binata*  
*spathulata*

#### Polygaleæ—

*Comesperma defoliatum*

#### Meliaceæ—

*Melia composita*

#### Tiliaceæ—

*Elæocarpus cyaneus*

#### Viniferæ—

*Vitis hypoglauca*

#### Leguminosæ—

*Zornia diphylla*  
*Desmodium brachypodium*

#### Rosaceæ—

*Rubus parviflorus*

#### Myrtaceæ—

*Melaleuca styphelioides*  
*Tristania laurina*

#### Umbelliferæ—

*Siebera stephensonii*  
*ericoides*

*Hydrocotyle vulgaris*

#### Santalaceæ—

*Exocarpus cupressiformis*

#### Loranthaceæ—

*Loranthus celastroides*

#### Compositæ—

*Senecio vagus*

#### Goodeniaceæ—

*Scævola suaveolens*  
*Goodenia ovata*

#### Scrophularinææ—

*Herpestis monniera*  
*Mimulus repens*

#### Lentibularinææ—

*Utricularia uniflora*  
*biloba*

#### Epacridææ—

*Leucopogon virgatus*

#### Orchideæ—

*Cryptostylis erecta*  
*Orthoceras strictum*

## FEBRUARY.

## Malvaceæ—

*Sida rhombifolia*

## Viniferæ—

*Vitis clematidea*

## Salsolaceæ—

*Suaeda maritima*

## Amarantaceæ—

*Alternanthera denticulata*

## Polygonaceæ—

*Polygonum strigosum*  
*subsessile*

## Leguminosæ—

*Desmodium rhytidophyllum*

## Myrtaceæ—

*Eugenia Smithii*

## Rhamnaceæ—

## Umbelliferae—

*Daucus brachiatus**Xanthosia pilosa*

## Santalaceæ—

*Exocarpus stricta*

## Compositæ—

*Cassinia aurea*

## Scrophularinææ—

*Gratiola peruviana*

## Acanthaceæ—

*Eranthemum variabile*

## Liliaceæ—

*Eusbiephus Brownii*

## Orchideæ—

*Spiranthes australis*

## ON MICRO-ORGANISMS IN TISSUES OF DISEASED HORSES.

BY DR. OSCAR KATZ.

Under date March 22nd last, Mr. E. Stanley, Veterinary Surgeon to the Government of New South Wales, reported on a disease which broke out among horses in the south-west of this colony, causing an alarming mortality among them. It would seem as if the disease was first noticed at Mingary, South Australia, early in December, 1886, but it is uncertain whether the horses attacked came from that colony or from New South Wales. It commenced to spread through railway contractors' teams, of which 40 animals out of 150 succumbed. There was at the time plenty of horse-labour employed, owing to the construction of a railway from Peterborough (S.A.), to Silverton (N.S.W.), as well as to the extensive mining industries along the Barrier Ranges, and horse-owners not knowing anything about the character of the sickness and its treatment, being also anxious to escape the infected spots, caused the disorder to invade remote districts on the River Darling, and to go down to the south as far as Port Pirie. It is also said to have been carried by sea to Albany, Western Australia. At Silverton, a town in one of the silver-mining districts of the Barrier Ranges, it made its appearance on January 12th, 1887, and it was to this place that Mr. Stanley went to investigate it.

He describes it as an "epizootic contagious fever," the contagious matter of which, given off by the diseased through serous discharges from the body-orifices, principally those of the head, and through the faeces, is taken up by healthy individuals through contaminated food (water included). It does not affect other animals or man. Although resembling, to some extent, certain



horse-diseases known under the terms of "epizootic cellulitis," "rheumatic influenza," "pinkeye," "purpura haemorrhagica," "epizootic pneumonia," it differs from all of them considerably.

"The disease shows a disturbance of the vascular system, with alterations in the character of the blood which cause obstructions in the capillary vessels, followed by haemorrhagic spots, accompanied by organic complications, more or less severe "

The characteristic symptoms are: rapid pulse and breathing, high body-temperature, highly inflamed eyes, swollen head and limbs, rapid loss of flesh, associated with great debility.

Mild forms of the fever occur ; convalescence after severe attacks progresses very slowly. The mortality was about 10 to 15 per cent. during the inquiry.

About the period of incubation the report says :—" From the time of exposure to infection, from three days to three weeks " (that means to say, as I understand it, from the moment of expo-

3. "Teamster's mare, 5 years old. Ill three or four weeks. The spleen was very much enlarged and honey-combed, with purulent matter, and the lymphatic glands generally inflamed."

4. "Hack mare, 3 years old, foal at foot, ill about three weeks, with a spleen in the same condition."

"The small intestines in every case were healthy."

In two (Nos. 3 and 4) out of these cases Mr. Stanley preserved some pieces of spleen and some lymphatic (mesenteric) glands; besides he secured in capillary tubes, which were afterwards closed, samples of vein-blood, withdrawn from the living animal during the height of the fever. All these specimens were handed to me for examination from the Department of Stock, some time ago. I communicated my report to the Chief Inspector of Stock, but being of opinion that the subject under notice might be of some interest to members of this Society, and that a somewhat fuller account published in its Proceedings, might help in either identifying the disease as a possibly known one, or recognising it, if not so, in case it should make its appearance elsewhere, I wish to say what follows.

The fragments of spleen and the lymphatic glands were—so I was informed on inquiry—secured immediately after the death of the patients, and at once transferred to methylated spirits. About three months having elapsed when I obtained for examination these specimens, which were pretty well hardened, I did not think it necessary to try to cultivate any micro-organisms out of them; and I may as well state beforehand that the character of the micro-organisms found in sections, did not admit of any positive result. So I proceeded to prepare a series of sections, some time after having changed the methylated spirits for absolute alcohol.

I shall speak first of the result of the examination of the *mesenteric glands*.

Sufficiently and uniformly stained sections (for instance by Loeffler's alkaline methylene blue or by bismarck brown) exhibited

under high powers of the microscope, at first glance, two morphologically different forms of bacteria. Their relative number to one another was not the same in all the preparations made; in this section the one, in that section the other was predominant; in others again both were nearly equally distributed. Generally speaking, their numbers were enormous throughout, notably in the surrounding tissue or capsule of the organs in question, where they were packed in dense masses. In the interior of the gland they were found partly detached or in short lines, partly grouped in small colonies, or forming elongated, straight or curved tracts, an appearance which would make it probable that they were located in capillary vessels.

The first of these bacterial forms is very conspicuous by its size as well as by its behaviour when treated with aniline dyes. It is a bacillus, about  $\cdot 003$   $\cdot 0045$  mm. long, (that is on the average

portion cannot be a spore, because it can be stained by the ordinary aniline dyes within a short time, and without further trouble.

Noteworthy is that these bacilli retain the colour on being treated after Gram's method (solution of aniline water and gentian-violet; solution of iodine in iodide of potassium; absol. alcohol). On being stained with aniline water—gentian-violet, or—fuchsin, and then transferred to a solution of hydrochloric acid (as used in staining tubercle-bacilli), they give off the colour again. Double or contrast stains may easily be obtained. Tolerably fair preparations were obtained by a dilute solution of gentian-violet, and by after-staining with picro-lithion-carmin. Far better results, however, were derived from transferring the sections first to a solution of picro-lithion-carmin for  $\frac{1}{2}$ – $\frac{3}{4}$  of an hour, at about 30°C., next, after having been washed a short while in dilute alcohol, to aniline-gentian-violet (s. above), for half-an-hour at the same temperature; hereafter rinsing a little with alcohol, then allowing Gram's solution of iodine to act for about one minute and a-half; absol. alcohol; oil of cloves; Canada balsam.\* The micro-organisms then appear dark blue on a pinkish underground. Equally satisfactory and very instructive preparations are obtainable by first colouring the section with aniline-gentian-violet for about  $\frac{3}{4}$  of an hour at about 30°C.; washing a moment in alcohol, then using the iodine-solution for one minute and a-half; absol. alcohol until colour is no longer given off; dilute watery solution of eosine for 1-2 minutes; mixture of absol. alcohol and oil of cloves; oil of cloves; Canada balsam.† After this process the organisms come out deeply blue, while the tissue-elements (and another form of bacteria, s. below), assume a handsome pink colour.

---

\*Cf. Biondi, Die pathogenen Micro-organismen des Speichels. Zeitschr. f. Hygiene. Band II., Heft 2, Leipzig, 1887, p. 201.

†Cf. Biondi, l.c.

Finally, after having stained the sections after Gram (see above), I have tried successfully a contrast stain by means of dilute solutions of vesuvin or bismarck-brown, in which the sections were kept about one minute. Afterwards I found the bacilli under consideration again of an intense blue, the tissue yellowish brown. Among the bacilli there were, here and there, specimens in which that portion showing but a faint colour reaction, and losing this little of colour by Gram's method, presents now a distinct though faint brownish or yellowish tint, in contradistinction to the other portion with its intense blue colour.

The second form of bacteria are also bacilli of the same length, but as a rule, of only about one-half to two-thirds of the width of the former. As regards their outlines and their relation to the tissue, they behave in much the same way as those, with which they are either mixed or not. But their protoplasmic contents do not exhibit that peculiar differentiation into two portions as seen there; but are of the same colour as the surrounding tissue, which is stained a

of the respective individuals, cannot be definitely settled by what I was able to ascertain. However, it is not at all impossible, and I rather incline to that view, that as in typhoid fever, the occurrence of these micro-organisms in the mesenteric glands may be interpreted. I do not think it probable for them to be merely accidental. I want especially to draw attention to the peculiar morphological features of the bacteria, which I do not remember to have ever seen in preparations or figures, or noticed in descriptions.

Sections out of the fragments of *spleen*, which offered on the cut-surface a marbled or "honey-combed" appearance, caused by greyish-dirty necrotised masses alternating with brownish-red tissue (as seen in alcohol), yielded no such bacteria as did the mesenteric glands, but more or less numerous aggregations of another kind. It consists of streptococci. They readily stain with aniline dyes, for instance Loeffler's alkaline methylene-blue. On employing Gram's method (s. above), one finds them to remain coloured, and it is in this way that one procures the finest and most instructive preparations. In a section thus prepared one sees, at a low amplification (for instance of 70 diam.), a number of deep-blue foci amid the yellowish-grey tissue of the spleen, and irregularly distributed in the same. In some preparations they were very plentiful, in others scarce. They are of an irregular, roundish or elongated shape, in the latter case up to .3 mm. long, whereas the smallest groups measure .01 mm. and still less. Under high powers these groups or foci are found to be made up of aggregations of minute, about .00045 mm. large, isodiametrical cocci (hence they are about the fourteenth part of the diameter of a human red blood-corpuscle). As a rule, they form more or less elongated strings or chains, which are interlaced with one another in different ways. Such chains are especially distinct at the margins of the aggregations; in the interior of the latter, particularly if dense, the micrococci are often isolated or in two's. Besides these masses which, as such, can

be rendered visible by low magnifications, one observes in going over the sections with an immersion-lens, detached chains in large numbers. They look very delicate, are bent differently, and embrace in some cases up to 30 links. These do not touch each other immediately, but are separated from each other by bright interspaces of about half the diameter of the cocci.

Their occurrence in the spleen extends not only to the necrotic parts, but also, though apparently less numerous, to the tissue which still contains well colourable nuclei; in sections stained with alkaline methylene-blue there were some groups of the streptococci undoubtedly disintegrated or about to disintegrate. We are, I think, pretty well justified in assuming that the presence of these necrotic masses in the spleen is due to the action of the described micrococci. We have analogies enough of this kind. But whether or not these micro-organisms are identical with

These organisms, being besides a little larger than the streptococci in the spleen, are therefore morphologically different from the latter.

Another portion of the blood was used for cultivation purposes. On being transferred on an inclined surface of nutrient gelatine in test-tubes, it gave rise to a pure culture of micrococci similar to those in the blood. The cultures grew but slowly, being at the beginning greyish, then orange, and ultimately assuming a bright coral-red colour. The cultures did not liquefy the gelatine. They resembled to some extent, *Micrococcus cinnabareus* (Flügge, *Microorganismen*, Leipzig, 1886, p. 174), and had, so to say, not the look of being infectious. Still I inoculated with such gelatine-cultures of the first, second, and third generations, six house-mice subcutaneously, of which four died, one of them after somewhat less than twenty-four hours, one within 30-44 hours, the third after forty-five hours, and the fourth after ten days. I doubt whether the inoculated culture had anything to do with the death of this latter animal. With some heart-blood of the first-mentioned mouse, which died in less than twenty-four hours, another mouse was infected; it died after about twenty-four hours. In this way I continued to inoculate from mouse to mouse in two other cases; death each time ensued after about the same time (twenty-four hours). Want of mice caused me to interrupt those experiments. There were no characteristic or constant pathological changes noticeable in the organs of the dead animals. A microscopic examination of, and cultivation experiments with, blood and sap of organs yielded negative results. The inoculated micrococci were never found there; however from the place of inoculation these micro-organisms were obtained. According to this result, no infection had taken place in the mice experimented upon, and the fatal results with most of them must be considered due to some toxic substance or substances elaborated by the multiplying organisms. These, then, are not infectious, at least not for mice; no doubt they were



derived from germs which, as contamination, found their way into the capillary tubes, somehow or other, when the sample of blood was collected. Here they grew for some time till the supply of oxygen present was exhausted. It is remarkable that they revived, after four months' imprisonment in the hermetically sealed tubes, on being transferred on to fresh nutrient material. I may mention, without any further going into details of the behaviour of this kind of micrococcus, that, when some of the original blood containing it, was uniformly distributed in liquefied gelatine (1.5 p.c. grape sugar in it), which was then solidified, colonies made their appearance only at the gelatine-surface, and a little below it; but here they remained insignificant. Thus this pigment-producing microbe furnishes another example of exclusively aerobic bacteria.

**OBSERVATIONS ON THE EARLY STAGES IN THE  
DEVELOPMENT OF THE EMU (*DROMÆUS NOVÆ-  
HOLLANDIÆ*.)**

**BY WILLIAM A. HASWELL, M.A., D.Sc., F.L.S., LECTURER ON  
ZOOLOGY AND COMPARATIVE ANATOMY, UNIVERSITY OF SYDNEY.**

**(PLATES VIII.-XV.)**

The number of works and papers on the development of birds is so great that an apology would almost seem to be required for adding one more to the list. But while the common fowl, pigeon, sparrow, thrush, nightingale, red-breast, canary, tit, lapwing, thick-knee, plover, duck, goose, tern, sea-gull, and some others have been dealt with as regards their embryology in whole or in part, there are no recorded observations on the development of any member of the great Ratite or Struthioid sub-class; and I have therefore thought it worth while to place on record the results of a study of the early development of the Emu, on which I have been engaged during the last few months.

In what follows there may seem to be a little which may be regarded as a threshing-out anew of a well-threshed subject; but when it is considered how wide is the diversity of opinion even at the present time among embryologists as to the significance of certain of the facts of avian embryology, it may be acknowledged that the reconsideration of certain of these in the case of a type so widely removed from those ordinarily studied may be of some value.

I have to acknowledge here my great indebtedness to my friends Dr. R. L. Faithfull, of Lyons Terrace, Sydney, and Dr. Eric S. Sinclair of Gladesville Asylum, to whose kindness I owe my supply of material for this research.

It will be superfluous to preface the account of these observations with any general resumé of previous investigations and theories on avian embryology. This has been done with sufficient thoroughness from different standpoints by Kolliker, Balfour, Wolff, Koller, Duval, and others; and I shall merely allude in their place to such points in the literature of the subject as are suggested by these observations on the emu.

For comparison I have used only the common fowl; and for the most part the methods employed were the methods of treatment and preparation followed in the study of that bird\*, with such modifications as were rendered necessary by the larger size and different consistency of the yolk. The eggs of the emu were incubated at a temperature of from 35° to 40° C. Under this treatment there was a very considerable range of variation in the stage to which a given period of incubation would bring different eggs; but there were in one of the two sets of eggs at my disposal

The various parts of the egg have precisely the same relations as in the fowl; the white is rather less in proportion to the yolk; but there is no other difference of importance. The yolk is about seven and a-half centimetres in its long, and seven in its short diameter; the long axis coincides with that of the egg; and usually there are discernible a broad end and a narrow end corresponding with the broad and narrow ends of the egg itself.

The embryo was usually found to lie with its long axis at right angles with the long axis of the yolk and of the egg; but not unfrequently the position was oblique, though never longitudinal.

The unincubated blastoderm was of nearly the same size and appearance as in the fowl, and was not made the subject of special examination. In eggs incubated for from about forty-seven to fifty hours the entire blastoderm was about a centimetre in diameter; the area pellucida was two millimetres in diameter, and with a dark patch, the 'embryonic shield,' in the middle.

A blastoderm of fifty-one hours was the earliest of which a thorough study was made. The entire blastoderm was a centimetre in breadth and the area pellucida three millimetres in its greatest diameter. The area pellucida presented two regions—an anterior which was rounded and rather broader than long, and a posterior, which had the appearance of a very short and narrow bay of the anterior part. This posterior bay (the 'Zuwachsstück' of His) is the commencement of the primitive-streak region, and presents an indistinct dark axial band which is the commencement of the primitive streak. In no part was there a trace of a primitive groove. When examined in sections this blastoderm was found to consist throughout of only two completed layers—an upper and a lower. In the anterior larger part of the area pellucida these are separated throughout by a well-marked interval. In the posterior bay they are confluent along the middle line—forming the primitive streak. A little distance in front of the anterior end of the primitive streak the lower layer presents in the middle a slight thickening of no great extent. This is the earliest rudiment of

the so-called 'head-process' (Kopffortsatz) of the primitive streak, the significance of which will be discussed later on. It begins very gradually in front and passes behind without interruption into the primitive streak. In this 'head process' as well as in the region of the primitive streak (plate XII. fig. 9) the lower layer presents below, here and there, a flattened cell. These flattened cells are very far at this stage from forming a complete layer in this part of the blastoderm; but there can be no doubt that they are the first-formed elements of the definitive hypoblast produced by modification of some of the lower-layer cells. In the middle of the primitive-streak region those cells are more numerous, and for a short distance form a complete layer; but not even there are they separable from the rest of the lower layer except by their shape. The two lateral halves of the primitive streak are completely coalescent, there being at no point any indication of the "suture" or of the canals which are to be seen at a later stage. The primi-

very well-defined border, in front of which is a transverse dark space with a convex anterior border and shading off behind into the primitive streak proper.

In the anterior part of the area pellucida of this specimen, as seen in sections, there are only two layers—epiblast and lower layer. The cells of the latter have not here yet taken on their flattened form, but are irregular and amoeboid, many of them thickly loaded with granules, arranged in a single layer. The epiblast consists in the middle of several layers of cells containing in many instances large granules: at the sides it consists of a single layer. The mesoblast has not yet extended into this region. As we pass backwards the cells of the lower layer gradually lose their amoeboid character and become more flattened, though still irregular in shape—the change in their form beginning in the middle line.

The “head-process” (plate XII., fig. 10) is now larger than in the preceding stage, and its cells have assumed an irregular, sometimes stellate, form; here and there, as before, there is a flattened cell foreshadowing the hypoblast, but the majority of the cells are manifestly assuming the form of stellate mesoblast cells. Behind, as in the last stage, the head-process passes without interruption into the axial plate. In the primitive streak itself (plate XII., figs. 11 and 12) there is the usual axial plate continuous with the surface epiblast, its lateral wings extending outwards between the epiblast and the hypoblast, which latter has now in this region become developed into a continuous layer of somewhat flattened cells. The mesoblast extends outwards far beyond the termination of the hypoblast in the germinal wall.

In the hinder part of the primitive streak region (fig. 13) there is below the primitive groove what appears like an imperfectly united longitudinal cleft or suture in the axial plate. The hypoblast below this is continuous across the middle line, but in the centre, just below the “suture,” the ordinary hypoblast cells are replaced by a large cell filled with coarse granules. Though this is a fresh formation since the last stage, we have here an

indication of the lips of the anterior part of the blastopore, the connection of which with the marginal portion has long been lost.

Below the blastoderm proper in this specimen are a number of large cells (*n*, figs. 10-12) mostly of rounded form, filled with large granules. These are present also in the last stage, but not so definitely arranged. In the blastoderm now being described they become very numerous below the head-process, where they form a broad axial band. A few of them are to be observed in the substance of the lower layer itself. In the primitive-streak region they are arranged for the most part in a double row, one running along below each lateral limit of the developing mesoblast. These are evidently the bodies termed formative cells by Balfour, globules of Ecker by Duval. They have been found to be derived from segmentation nuclei which appear on the floor of the segmentation cavity. It would seem probable from their arrangement as above described that their special function is the conveyance of nutriment directly or through the cells of the hypoblast to the developing mesoblast. At a stage when the mesoblast is well

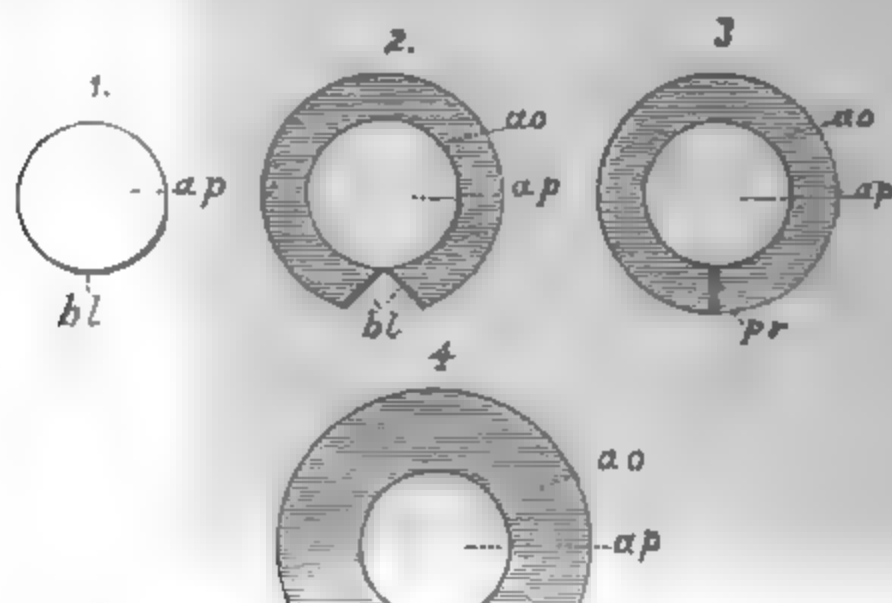
passes without interruption into the axial plate. and here a well-formed hypoblast becomes first clearly marked off. In the region in front of the primitive streak and behind the crescentic groove—the region that is of the future medullary plate—the epiblast is thicker than in the surrounding parts of the blastoderm, and its cells have a more regular form. The suture in the primitive streak referred to above, has now altogether disappeared, and the two halves are closely united throughout their length.

A study of the three stages which have been described, renders it evident that the primitive streak cannot grow forwards from the posterior border of the area pellucida, as it is generally described as doing; but that it is formed from before backwards simultaneously with an extension backwards in the form of a narrow bay, of the area pellucida. The sub-germinal cavity, that is to say, sends an axial bay backwards, the posterior part of the germinal wall bends backwards at the same time along the border of this bay, and there is thus formed a narrow posterior prolongation of the area pellucida, on the surface of which the primitive streak appears. Its first rudiment is apparently an axial thickening of the upper layer on the region of the area opaca which is to be converted into this bay; and as the bay extends back the lower layer also thickens, the two thickenings uniting. The area pellucida has meantime been extending itself by growth in all directions, with the result that the anterior end of the primitive streak comes to be situated not far behind the middle of the anterior circular part of the *area pellucida*. That there is, however, a certain forward growth of the anterior end of the streak after it has become formed, seems probable when we compare figures 1 and 2 in plate; it is, however, of much less extent in the emu than in the fowl.

The accompanying woodcuts are designed to illustrate the history of the formation of the primitive streak in the emu. Only a part of this history is traceable in the ontogeny of the individual, and much less than at the outset I had hoped to find,—little more in fact than in the chick, save that the mode of growth of the



primitive streak region is more readily traceable in the emu, and that the relations of the primitive streak are not complicated by the formation of a sickle or of a sickle-groove. The earliest stages in the development of the blastoderm I assume to be similar to those of the embryos of carinate birds as described by Duval.\* Fig. 1



rapid extension of the blastoderm in all directions. In fig. 3 the two halves of this border have come together to form the axis of the primitive streak. This stage, in which the lateral halves of the primitive streak, meeting along the middle line in a sort of suture, run from the posterior border of the area pellucida to that of the area opaca, has not been observed, and possibly does not occur in the ontogeny of any bird. In figure 4 the area pellucida is represented as beginning to send backwards a narrow prolongation, on the surface of which the primitive streak becomes revealed. The posterior part of the suture, i.e., that part which traverses the area opaca, is not represented in the emu, so far as I have been able to ascertain, even by a posterior notch such as is not rare in the fowl\*; the primitive streak would appear in fact (in the history of the individual) to be formed on the surface of the area pellucida as the latter extends backwards, and to be only foreshadowed in the area opaca by a median thickening of the upper layer, which does not extend far back. The remaining two figures are intended to illustrate the manner in which, as pointed out by Duval, the anterior end of the primitive streak comes in its later stages to be situated so far forwards simply by the considerable extension of the area pellucida on all sides.

The 'head-process,' to which repeated allusion has already been made, has been, as regards its relations in the chick, the subject of some discussion. By Kölliker† it is described as being a prolongation forwards from the anterior end of the primitive streak; and, in accordance with his view of the origin of the primitive streak, he regards it as derived from the epiblast; he is of opinion that it probably gives rise to the whole of the head.

Gerlach‡ describes it as a thickening of the endoderm, and as separated from the cells of the primitive streak behind by an

---

\* Whitman describes (XXXII) an abnormal blastoderm of the chick in which this line of coalescence is represented on the area opaca by a continuation backwards of the primitive groove to the posterior border.

† XXIV., p. 107.

‡ XVI., p. 45.

oblique cleft. There is no trace of any such break in any of my series of sections; the axial plate in fact is completely continuous with the head-process. It is very difficult, however, to say whether or not the thickening constituting the 'head-process' is brought about by an invasion of cells from the primitive streak. The former (which is more correctly described as *medullary plate of lower layer*) is continuous with the latter by a process of cells, but whether cells travel forwards through this process and add to the thickness is hardly capable of being decided. It seems probable that the 'head-process' is merely the continuation forwards for a short distance of that axial thickening of the lower layer, which, as above described, accompanies the formation of the primitive streak, and, except that it does not coalesce with the epiblast, the history of the lower layer is the same here as further back; a layer of flattened hypoblast is derived from the lowest of its cells, and the rest is converted into mesoblast.

It may be useful to sum up here the history of the formation of the mesoblast in the emu. When the primitive streak is first

its close connection with the epiblast has the appearance, especially after the primitive groove has become formed, of being an outgrowth from an involution of the epiblast. The mesoblastic plates are formed by outgrowth from this primitive mesoblast of the primitive streak extending outwards between the epiblast and the hypoblast. The union of the primitive mesoblast with the epiblast in the axial line of the primitive streak being complete, it is very difficult to say that the epiblast has no share in the growth of the lateral plates ; probably the union exerts some influence on the activity of the primitive mesoblast cells ; but I think we may safely say in view of the facts adduced above, that the foundation of the mesoblast of the whole embryo is laid by the cells of the lower layer, and that no part of it up to this point is formed directly from the epiblast.

The above account of the formation of the mesoblast in the emu is in substance the same, so far as I can ascertain at second-hand from Koller's summary\*, as that put forward by His for the fowl. It is the view also maintained by Rauber†, by Disse‡, and by Duval§. On the other hand Kölliker|| regards the mesoblast as formed by ingrowth from the epiblast along the line of the primitive streak. Gerlach¶ also describes the mesoblast as of epiblastic origin, and also Koller, who, however, regards the participation of the hypoblast as probable, but not certainly ascertained. Balfour\*\* maintains that part of the mesoblast of the primitive-streak region is derived from the epiblast.

In connection with this subject it has to be noted that the chick as described by Balfour and others, differs from the emu, in that

---

\* XXII. p. 202

+ XXVIII.

‡ XI. p. 86.

§ XII. p. 115.

|| XXIV. p. 93, &c.

¶ XVI.

\*\* III.

in the former the hypoblast is present as a distinct layer in the hinder part of the area pellucida before the formation of the primitive streak, and it is this, apparently, that has given rise to the view so widely maintained that the mesoblast in the region of the primitive streak is mainly derived from the epiblast, or that the whole mesoblast is so derived.

During the ensuing few hours the blastoderm increases rapidly in size, its diameter nearly doubling itself in a comparatively short time ; the area pellucida, however, does not increase in dimensions in the same proportion. In a specimen which had been incubated for seventy-eight hours, the area-pellucida (plate IX., fig. 3) was still only about four millimetres in length. A little in front of the middle is a rounded elevation, the head elevation, which slopes away gradually behind, but in front is circumscribed by a well-defined strongly convex border—the border of the head fold. Running along the axis of this elevation is a narrow and deep fissure, which reaches from close to the convex anterior border to about the middle of the area pellucida, ending apparently abruptly

the mesoblast cells of the lateral plate. Without examining series of sections of a somewhat earlier stage than this it would be impossible to say positively that the notochord does not here arise from the hypoblast, but from the mesoblastic portion of the lower layer after the hypoblast has become separated from it as a definite layer of flattened cells: yet the similarity in character between the cells constituting this early rudiment of the notochord, together with the special character of the hypoblast cells and the absence of any transition forms between the two, would seem to strongly favour such a supposition.

There is no demarcation in the series of sections between the medullary groove and the primitive groove—the one passing insensibly into the other (plate XIV. fig. 19.). Where the axial groove becomes shallower behind the head-swelling the axial part of the mesoblast becomes continuous with the epiblast at the bottom of the groove and with the hypoblast below; and this coalescence of the three layers alone marks the passage from the embryonic region to the region of the primitive streak (fig. 20.). At its posterior end the primitive streak is elevated in the form of a ridge along the middle of the anterior part of which runs the primitive groove. In this region there are still only two layers—upper and lower.

In the next stage examined (plate IX. fig. 4) (in which, however, incubation had only gone on for 69 hours) the blastoderm was about five centimetres in diameter, the head-fold had become considerably further advanced, the medullary groove had become greatly increased in length, and the medullary folds much more prominent, though they had not yet begun to unite, and were only closely approximated in the cephalic region. There are five pairs of protovertebræ. At this stage there is no appearance of a neurenteric canal; the notochord passes directly behind into the substance of the axial plate, which is still of considerable extent. There is no mesoblast in the region in front of the head. The head-folds of the splanchnopleure have become united in the region of the head to form a short fore-gut. In the diverging splanchnopleure folds there is yet no rudiment of the heart.

A comparison of this blastoderm with the preceding one, and a comparison of corresponding stages in the fowl will show that the notochord extends backwards much more rapidly than the whole embryonic region *plus* the primitive-streak region increases in size. This it can only do at the expense of the cells of the axial plate, with which it is continuous behind. Since, however, the notochord is never found to extend backwards in this axial plate, it follows that as the former grows backwards the cells of the latter become detached from the epiblast and spread out, so as to resemble in their arrangement the mesoblast cells in front of them. There is in this way a progressive separation from before backwards of the deeper part of the axial plate from a surface layer of epiblast. Thus, in a sense, the primitive streak takes part in the formation of the hinder part of the embryo, becoming at the same time gradually reduced, till it occupies at last only an extremely small space at the posterior end of the embryo. In this manner the anterior part of the primitive streak becomes the posterior part of the medullary plate, and the primitive

In the next stage observed, the head has become distinctly folded off, there is a rudiment of the tail-fold, and there are two pairs of protovertebræ; the anterior or cephalic fold of the amnion is rising up around the head, and the caudal fold is distinguishable, though not prominent. The neural canal is closed throughout except a very small portion at the posterior end; the cerebral vesicle presents no trace of subdivision, and the medullary canal is not prolonged backwards as it is at a subsequent stage.

The next stage (plate X, fig. 5) was from an egg which had been incubated for sixty-five hours. The whole blastoderm was seven and a half centimetres in diameter. The medullary canal was closed throughout, the primary vesicles of the brain distinguishable, with rudiments of the optic vesicles and a commencing division of the hind-brain into two.

In an embryo of ninety-four hours, which corresponds very closely with a thirty-six hours' chick, there are sixteen pairs of protovertebræ and the primary vesicles of the brain are distinguishable; the heart has the form of an S-shaped tube, and "blood-islands" have begun to make their appearance on the future vascular area. The medullary canal is nearly completely closed; behind (plate X. fig. 6) it is continued backwards in the form of a pear-shaped structure—the remains of the primitive streak, such as is often to be seen in a corresponding stage in the chick. At this point, as is seen from sections, the notochord terminates by becoming merged in what remains of the primitive streak; the hinder end of the medullary canal sends a short prolongation downwards into the mass of cells constituting the remains of the primitive streak, but this downward prolongation is short and ends blindly below. It is the only representative of the *neurenteric canal* found at a later stage. Behind it the three layers are all united in the middle line for a short distance.

There is still only a very thin layer of mesoblast in the region in front of the head. The fore-brain presents the merest rudiments



of optic lobes, and its ventral wall is still incompletely united along the middle line. The intermediate cell mass is very clearly distinguishable, but there is as yet no indication of the Wolffian duct. The notochord is continuous behind with the floor of the medullary canal; at this point it is continuous with the hypoblast at the sides.

In an egg which had been incubated for a hundred and eighteen hours, the blastoderm was found to be about seven and a half centimetres in diameter; the vascular area, still without developed blood-vessels, was eight millimetres in length, thus being smaller than the last. There were nineteen protovertebræ. The heart and splanchnopleure folds were not further advanced in development; the optic lobes had just begun to bud out, and the amnion invested the whole head end of the embryo. The neurenteric canal is not yet distinguishable. From the hinder end of the medullary canal (plate X. fig 7) there leads backwards a narrow passage which

front of this there is a very distinct neurenteric canal, which is readily discernible when the embryo is looked at from the ventral aspect. In front of it, where the notochord ends posteriorly, there is a complete continuity of epiblast, mesoblast, and hypoblast, and the notochord is continuous with the hypoblast.

As will be seen from the series of sections figured (plate XIV. figs. 21-23), the passage is a very direct and open one, leading from the posterior end of the completely closed neural canal behind the extremity of the notochord (*n. ch.*) into the enteric cavity. The wall of the passage has the same structure as that of the neural canal, but the passage cannot be regarded as strictly a bending downwards of the posterior end of the neural canal, the latter being continued backwards behind it, though only for a very short distance. At this stage the notochord has become separated from the mesial thickening of the primitive streak, with which it was at first continuous, by the intervention of the neurenteric canal, and its posterior end appears as a thickening of the hypoblast. It remains separate from the floor of the medullary canal, in front of the neurenteric passage, though it may be said to pass into it round the sides of the latter.

An embryo of a hundred and twenty-one hours, though incubated for three hours longer than that just described, had apparently scarcely attained the same stage of development, since the posterior end of the medullary axis presented exactly the same appearance as in the case of the embryo of a hundred and fifteen hours; and there was an evident, though very narrow, neurenteric canal.

The neurenteric canal above described is the equivalent of that first described by Gasser in the goose, and subsequently noticed by Balfour and by Hoffmann in the chick, of the first (more anterior) of those described by Braun in the duck and the wagtail, and of the one described by the same author in the pigeon and fowl and in *Melopsittacus undulatus*.

The only later stage examined was an embryo of seven days, which had attained to about the same grade of development as a 60 hours' chick, with well developed vascular area, heart bent upon itself, visceral arches and clefts, cranial flexure well marked, lens-involution still connected with the epiblast, auditory sac still opening on the exterior, and with the amnion completely covering the whole surface with the exception of a small key-hole-shaped aperture above the posterior end of the medullary canal.

In this specimen (plate XV, figs. 24-28) there is in the caudal region, just behind the posterior end of the notochord a passage (neurenteric canal) from the hinder end of the medullary canal to the hind gut. This corresponds in position to the neurenteric canal already described at a much earlier stage ; but whether it is the same canal or a fresh formation is uncertain. It is the equivalent seemingly of a canal which has sometimes been observed in the

- V.—BALFOUR, F. M. On the Disappearance of the Primitive Groove in the Embryo Chick. Q. J. Micro. Sci. XIII., 1873; and Works, Memorial Edition, Vol. I., p. 41.
- VI.—BALFOUR, F. M. A Comparison of the Early Stages in the Development of Vertebrates. Q. J. Micro. Sci. XV., 1875; and Works, Memorial Edition, Vol. I., p. 112.
- VII.—BALFOUR, F. M. On the Early Development of the Lacertilia, together with some Observations on the nature and relations of the primitive streak. Q. J. Micro. Sci. XIX., 1879, and Works, Memorial Edition, Vol. I., p. 644.
- VIII.—BELLONCI, G. Blastoporo e linea primitiva dei Vertebrati. Atti Accad. Linc. Mem. (3). Vol. 19. [Abstract in Zool. Jahresber., 1884, IV.]
- IX.—BRAUN, M. Aus der Entwicklungsgeschichte der Papageien. Bericht d. 52 Vers. deutsch. Naturf. u. Artze zu Baden-Baden (1879), and Verh. Phys. Med. Ges. Würzburg, 14 Bd. (1880). [Abstracts in Zool. Jahresb., 1879, II., and 1880, IV.]
- X.—BRAUN, M. Die Entwicklung des Wellenpapageies (*Melopsittacus undulatus*). Arbeit. a. d. Zool.-Zoot. Institut zu Würzburg, V. [Abstracts in Zool. Jahresb., 1879, II., and 1881, IV].
- XI.—DISSE, J. Die Entwicklung des mittleren Keimblattes im Huhnerei. Arch. f. mikr. Anat. XV. (1878).
- XII.—DUVAL, M. De la formation du blastoderme dans l'oeuf d'Oiseaux. Ann. des Sciences Nat. Zool. (6me série), tome 18 (1884).
- XIII.—DUVAL, M. Étude sur la ligne primitive de l'embryon du poulet. Ann. Sci. Nat. VII. (1879).
- XIV.—GASSER, R. Der Parablast u. der Keimwall der Vogelkeimscheibe. Sitz. Ber. Nat. Ges. Marburg, Nr. 4. [Abstract in Zool. Jahresber., 1883, IV., p. 136].
- XV.—GASSER, E. Beiträge zur Kenntnis der Vogelkeimscheibe. Arch. f. Anat. u. Phys. 1882. Anat. Abth. 4/6 Heft, p. 359-398. [Abstract in Zool. Jahresber., 1882, IV.]
- XVI.—GERLACH, L. Die entodermale Entstehungsweise der Chorda dorsalis beim Hühnchen. Biol. Centralbl. I. Nr. 1, pp. 21-25 and Nr. 2, pp. 38-49.

XVII.—GOETTE, A. Beiträge zur Entwick. der Wirbelthiere, II. Die Bildung der Keimblätter und des Blutes im Hühnerei. Arch. f. mikr. Anat. X. (1874).

XVIII.—HENSEN, V. Embryologische Mittheilungen. Arch. f. mikr. Anat. III. (1867).

XIX.—HOFFMANN, C. K. Ueber die Entwicklungsgeschichte der Chorda dorsalis. Festschrift für Henle. [Abstract in Zool. Jahresber., 1882, IV].

XX.—HOFFMANN, C. K. Die Bildung des Mesoderms, die Anlage der Chorda dorsalis und die Entwicklung des Canalis neurentericus bei Vogelembryonen. Verb. Akad. Amsterdam, Deel 23. [Abstract in Zool. Jahresber., 1883, IV., p. 137].

XXI.—JANOSIE, J. Beitrag zur Kenntniss des Keimwulstes bei Vögeln. Sitzungsber. Wien. Acad. 84 Bd., 3 Abth. [Abstract in Zool. Jahresber., 1882, IV].

XXII.—KOLLER, C. Untersuchungen üb. d. Blätterbildung im Hühnerkeim. Arch. für mikr. Anat. XX. (1882).

XXIII.—KOLLER, C. Beiträge zur Kenntniss der Hühnerkeime im

- XXXI.—SPOOF, A. R. Beiträge zur Embryologie u. vergleichenden Anatomie der Kloake u. Urogenitalorgane bei den höheren Wirbelthieren. [Abstract in Zool. Jahresber., 1883, IV., p. 140].
- XXXII.—WHITMAN, C. O. On a rare form of the Blastoderm of the Chick. Quart. Journ. Micro. Sci. Vol. XXIII.
- XXXIII.—WIJHE, A. VAN. Ueber den vorderen Neuroporus und die Phylogenetischen Function des Canalis neurentericus der Wirbelthiere. Zool. Anzeiger VII.
- XXXIV.—WOLFF, W. Ueber die Keimblätter des Huhnes. Archiv f. mikr. Anat. XXI. (1882).

---

EXPLANATION OF PLATES.

PLATE VIII.

- Fig. 1.—Blastoderm of emu after 70 hours' incubation, with well-advanced primitive streak and primitive groove (*pr.*) on a narrow posterior prolongation (*p.*) of the area pellucida (*ap.*) The letter *h.* points to the slightly convex anterior border of the mesoblast extending forwards towards the region of the future head of the embryo. *ao.* area opaca. From fresh specimen.
- Fig. 2.—Blastoderm of 66 hours; rather further advanced than the preceding; the posterior prolongation of the area pellucida no longer sharply marked off from the rest, a crescentic groove (*h.*) marking the anterior limit of the mesoblast and of the medullary plate (*m.p.*). *pr.* primitive streak and groove. From prepared specimen.

Plate IX.

- Fig. 3.—Blastoderm of 78 hours, with advanced head-fold (*h.*) and rudimentary medullary groove and medullary folds (*m.*). From fresh specimen.
- Fig. 4.—Blastoderm incubated for 69 hours, considerably further advanced than that represented in fig. 3, with well-marked head (*h.*) and five pairs of protovertebræ. The medullary folds have become prominent and have almost met in the middle region of the head: the primitive groove is still of considerable extent. *h.a.* head-fold of amnion. *Sp.* splanchnopleure. From prepared specimen.
-

Plate x.

Fig. 5.—Embryo of 65 hours with eleven pairs of protovertebrae and developing vascular area. The vesicles of the brain have become differentiated, with slight rudiments of the optic vesicles of the fore-brain (*f.b.*), the hind-brain (*h.b.*) beginning to divide into two parts. The cleft in the fore-brain has become artificially enlarged. *h.*, heart. *v.* vitelline vein.

Fig. 6.—Hinder part of embryo of 94 hours, with seventeen pairs of protovertebrae. *pr.* remains of primitive streak.

Fig. 7.—Hinder part of embryo of 118 hours with nineteen pairs of protovertebrae, in which there is a narrow canal leading from the posterior end of the medullary canal and opening by a small pore (*p.*) on the surface. From fresh specimen.

Plate xi.

Fig. 8.—Embryo of 115 hours with twenty-four pairs of protovertebrae, with well-developed optic vesicles and heart. The

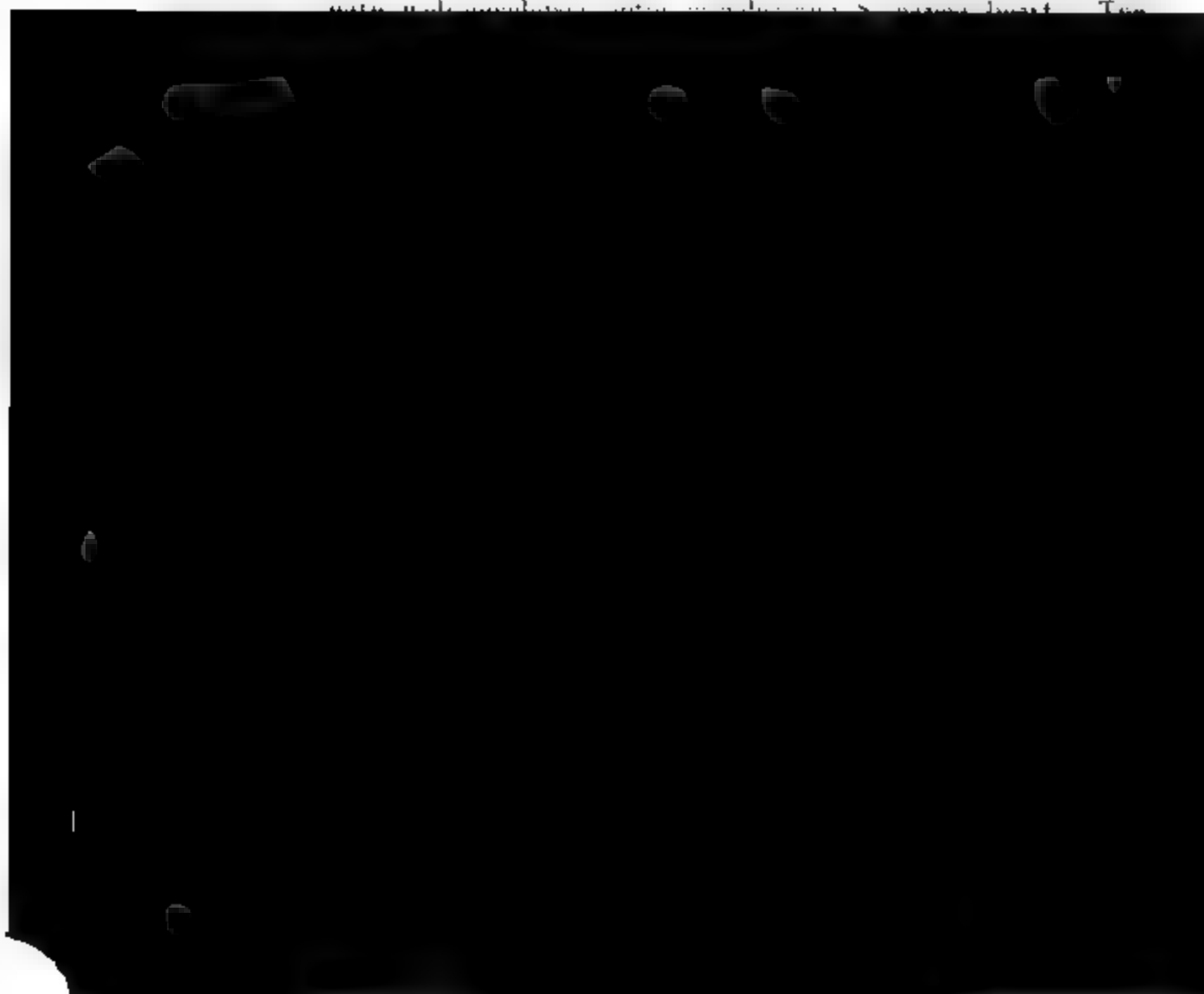


Fig. 12.—Section of the same a little further back, with complete hypoblast layer (*hy.*)

Fig. 13.—Section of the same showing secondary cleft in primitive streak. *pr.* primitive groove. *ms.* mesoblast. *ep.* epiblast. *n.* remarkable granular cell in hypoblast below the cleft.

Plate XIII.

Fig. 14.—Section of the same at the extreme posterior end of the primitive streak.

Fig. 15.—Transverse section through the head-swelling of embryo of 78 hours (fig. 3). *mg.* anterior part of medullary groove. *ep.* epiblast. *ms.* mesoblast. *fg.* commencing fore-gut.

Fig. 16.—Section of the same a little further back ; letters as before.

Fig. 17.—Central part of the same section more highly magnified.

Fig. 18.—Section of the same blastoderin passing through the hinder part of the medullary plate, with the rudimentary notochord (*n. ch.*) separated from the lateral plates of mesoblast (*ms.*).

Plate XIV.

Fig. 19. —Section showing the transition from the medullary plate to the region of the primitive streak : the notochord (*n.ch.*) passing into the axial plate.

Fig. 20.—Section a little further back behind the termination of the notochord.

Fig. 21.—Section of 115 hours' embryo (fig. 8) just in front of the neurenteric canal, showing the continuity of the hypoblast (*hy.*) with the notochord (*n.ch.*) at this point. *m.* medullary canal.

Fig. 22.—Section of the same a little further back, passing through the neurenteric canal.

Fig. 23.—Section of the same embryo a little behind the neurenteric canal. Letters as before.



Plate xv.

Figs. 24—28 are a series of sections through the hinder end of a seven days' embryo showing the neurenteric passage, and the relation of the hinder end of the notochord at this stage to the hypoblast of the hind gut.

Fig. 24.—Section just in front of the neurenteric canal, with separate hind gut (*hg*), notochord (*n. ch.*), and medullary canal (*m.*). *ms.* lateral plates of mesoblast. *am.* amnion.

Fig. 25.—Section a little further back at a point where the notochord has united with the wall of the hind gut.

Fig. 26.—Section showing union of wall of hind gut and of medullary canal.

Figs. 27 and 28.—Sections passing respectively through the anterior and the posterior parts of the neurenteric passage.

## NOTES ON AUSTRALIAN EARTHWORMS. PART IV.

By J. J. FLETCHER, M.A., B.Sc.

Quite recently through the kindness of Messrs. R. T. Baker, Alex. Morton, and H. J. Fletcher, I have received most valuable additional material enabling me in this paper to give a preliminary account of six new species of earthworms, of which four are from Gippsland, Victoria, one is from Tasmania, and one from New South Wales. Two of these especially comprise individuals of such fine and robust proportions as to present very favourable subjects for detailed examination. At present I merely give diagnoses of the species, such as I hope will enable them to be satisfactorily identified, reserving a fuller account of them until I come to review the whole. This course, I think, advantageous because I have not yet exhausted my stock of material, and certain characters—for instance those of the segmental organs, calciferous glands, spermathecæ—which, when only a few species had been examined, seemed likely to furnish characters of importance in discriminating genera, present, as more species come under notice, such more or less considerable variations within the limits of a single genus as to make it advisable to refrain from generalizations and detailed comparisons until a general knowledge has been gained of as many species as possible.

Three of the new species—two from Gippsland and one from Tasmania—are referable to the genus *Notoscolex*, of which two species, both from New South Wales, have been hitherto described. Now that it is shewn to extend to Tasmania and Victoria, and comprising as it does the largest and finest Australian earthworms yet recorded—with the exception of *Megascolides australis* of McCoy—it bids fair to rank as one of our most characteristic genera. Further search will probably show it to be of still wider

distribution, and it is not unlikely that the large, as yet undescribed, worms known to occur in Queensland and on the Manning, to which reference has already been made, also belong to it.

Another of the new species (*Cryptodrilus mediterraneus*) inhabits the north-western interior of this colony, my specimens having been found on the banks of the River Darling between Bourke and Brewarrina. No species has hitherto been recorded from so far inland as this; and its occurrence is of interest as showing that the dry interior, at any rate in proximity to rivers, is not destitute of earthworms, though remote from them, as far as I can learn at present, worms seem to be very scarce or are entirely wanting.

Owing to the large size of the Tasmanian and the largest Gippsland worms, and to their very favourable condition for examination—the breeding functions being in abeyance—what I take to be the true testes were found without any difficulty; and subsequently, knowing what to look for, similar bodies were recognised in the smaller species (doubtfully in the *Cryptodrilus*) though in these and the specimens examined the testes were obscured by

"testes," therefore, should now in all probability be regarded as vesiculæ seminales. Their usually racemose character, their situation and remoteness from the ciliated rosettes, together with the fact that when the worms are sexually active the segments containing the ciliated rosettes are crammed with spermatozoa, have previously helped to leave me in doubt as to their real nature, and to overlook the true testes.

I have to thank the gentlemen already named for their kindness and trouble, and also Mr. Hugh Copeland, Junr., who lent Mr. Baker a helping hand.

#### NOTOSCOLEX GIPPSLANDICUS, n. sp.

A young (spirit) specimen is 37 cm. long, 13 mm. broad; a large but very soft adult specimen is 4 feet 1 inch (1·23 metre) long and 17 mm. broad; number of segments about 500.\*

Prostomium broad, depressed, marked anteriorly and inferiorly with about seven somewhat irregular grooves, not dividing the buccal ring but looking like a forward projection of its superior region. The buccal ring all round divided right across by a number of longitudinal grooves, giving it a ribbed appearance; divided into two annuli, the anterior annulus again subdivided in the dorsal region by two shallow transverse grooves just behind the prostomium. Body cylindrical; superiorly especially anteriorly of a darker colour; clitellum still darker (purplish).

---

\* These large worms are so brittle that it is difficult to extract whole specimens from their burrows; hence the above-mentioned two are my only complete specimens. The following are the measurements of other incomplete examples:—

	No. of segments.	Length.	Breadth.
(a) Fragment (very soft) .....	460	3ft.	
(b) Complete all but preclitellar segments (very soft) .....	468	3ft. 9in.	
(c) Young specimen, nearly complete ...	402	11 in.	
(d) Fragment of a large specimen.....	335	43·2 cm. (17 in.)	22 mm.
(e)     "     "     "     "     " .....	451	63·5 cm. (25 in.)	22 mm.
(f) Young specimen, nearly complete ...	490	36·2 cm.	13 mm.

Hence it would appear that very large individuals are from 2-3ft. long when contracted, and, probably, from 4-6ft. long when living and extended.

The buccal ring rather broad (from before backwards); the second segment narrower, ribbed like the buccal ring, and faintly bi-annulate; each of the next three segments broader (from before backwards) than the one which precedes it; all of them divided into two principal annuli by a well-marked groove, the anterior annuli less distinctly again sub-divided into two; from segments vi to about xiv the maximum of length is reached, and these segments are usually very conspicuously tri-annulate, or some or all of the annuli may be subdivided into two, giving altogether six annuli to a segment; the next seven segments successively diminish slightly in breadth (from before backwards), after which they are of nearly uniform width for the rest of the body, and are faintly tri-annulate.

Clitellum wanting in the smallest specimens, fairly developed in one specimen, and distinctly indicated in all the large specimens by a difference of colour and by a slight glandular development; commencing with the middle or posterior annulus of xiii and including xxi (that is eight complete segments in addition to

of the two outer pairs further apart (about twice) than those of the inner pairs; the first row on each side about 3 mm. from the median ventral line, the second about 1 mm. from the first, the third about 3 mm. from the second, the fourth about 2 mm. from the third. The setæ are easily seen with a lens, and are usually plainly visible to the naked eye.

Male pores two, on xviii on slight papillæ about 9 mm. apart and about in line with the second setæ. The two oviduct pores are on xiv, rather close together, (3 mm. apart), in front but considerably ventrad of the inner rows of setæ. Spermathecal pores two pairs, ventral in position, between vii and viii, and viii and ix but just on the posterior margins of vii and viii, about 7 mm. apart, and just dorsad of the second row of setæ on each side.

Dorsal pores commence between about xix and xx; the first two or three less distinct than the others and sometimes hardly noticeable; nephridiopores not discernible.

Alimentary canal: the very muscular pharynx occupies the first four segments and has immediately behind it the first complete mesentery; the very short œsophagus and the gizzard are in segment v; in segments xii-xviii the lumen of the canal is dilated and its walls are very vascular, but there are no diverticula; the large intestine commences in xix.

Genitalia: true testes two pairs, in segments x and xi, small filamentous cellular masses attached low down to the posterior faces of the mesenteries between segments ix-x and x-xi and corresponding in position with the ovaries in xiii; opposite the testes, and therefore in segments x and xi, but quite free and independent of them in both the specimens dissected (in which evidently the breeding functions were in abeyance) are the two pairs of ciliated rosettes lying immediately in front of the posterior mesenteries of the segments which contain them; in segments xii and xiii (not the anterior pair in ix or xi as usual) two pairs of racemose vesiculæ seminales, membranous sacs containing spermatozoa in various stages of development, attached to the anterior mesenteries of the segments on each side of the intestine, (a third pair of somewhat similar-looking but very much smaller bodies in

a corresponding position in XIV, whose identification is at present doubtful); the prostates are two long narrow pinkish bodies in segment XVIII, each of them several inches long when unravelled and straightened out, convoluted and folded transversely with the long axis into a compact flat mass from which anteriorly comes off the genital duct which is fairly long and convoluted and entirely sheathed in a membranous envelope which extends on to and sheaths the prostate also, binding the transverse folds together, and two parallel bands of which in appearance almost like additional but incomplete mesenteries pass to the floor of the segment, the genital ducts lying between them; no penial setæ were met with, nor were the vasa deferentia visible in any part of their course.

The ovaries occupy the usual position in XIII; the oviducts commencing opposite to them in the same segment open to the exterior on the floor of the next one; the two pairs of spermathecæ are in V and VI, and each of them presents externally three or four

The segmental organs are minute tufts of glandular tubules distributed over the walls of the body-cavity, a hundred or so to a segment.

*Hab.*—Warragul, Gippsland, Victoria.

For the opportunity of describing this and the other three Victorian species I have to thank my friend and late colleague Mr. R. T. Baker of Newington College, who made a special visit to Gippsland in order to obtain material for me.

From *Megascolides australis*, a species described by Professor McCoy\*, from the same district, and comprising individuals quite as large as those of *Notoscolex Gippslandicus*, the latter differs in the following, among other particulars:—the clitellum is complete all round and is situated more anteriorly; the setæ of the ventral pairs are not closer together than those of the outer pairs, and are of the ordinary character, not tapering throughout towards the free tip as in McCoy's figure; the dorsal pores commence after about segment XIX, that is to say considerably in advance of segment XL.

I have heard from residents of Gippsland that these large worms were able to produce sounds, and Mr. Baker, whose attention I directed to this matter, tells me that in passing over the ground where these worms occur one does hear noises, which he considers may perhaps be due to friction of their bodies against the sides of the burrows, or to the sudden and forcible ejection of fluid from the dorsal pores, perhaps also to the suction of the air caused by a piston-like movement of their bodies, when the worms are disturbed by the vibration of the ground.

#### NOTOSCOLEX TASMANIANUS, n. sp.

A living specimen held up by the tail 1ft. 10½in. (57·2 cm.) long; the same specimen crawling on the table 19in. long (48·3 cm.) by about 12 mm. average breadth; after being killed with chloroform 24·5 cm. long, breadth from 12-21 mm. Very

---

\* Prodrömus of the Zoology of Victoria, Dec. I, (1878), p. 21, pl. 7.



large living worms when fully extended are over 2ft. long. A dozen rather contracted spirit specimens are from 20-25 cm. long, with a breadth of 19-24 mm. Number of segments about 200.

In living specimens four differently coloured regions may be recognised, (1) the flesh-coloured preclitellar region, (2) the yellower inclining almost to orange clitellum, (3) the greater part of the remainder of the body purplish or bluish white or grey, the intersegmental furrows purplish, (4) a posterior region tinged with brown; spirit specimens may appear more or less tinged with brown throughout.

Body cylindrical; when strongly contracted both extremities very obtuse; when extended tapering steadily anteriorly from about segment ix forward.

Prostomium slightly depressed, divides the buccal ring for about  $\frac{1}{3}$ , marked with two or three longitudinal grooves anteriorly and inferiorly so as to give it a ribbed appearance. The buccal ring

rows, sometimes alternating irregularly, sometimes a few nearly straight, at other times forming an ascending series of five or six, the amount of the sinuosity varying within considerable limits in the different individuals ; in one specimen these rows are, however, nearly straight.

Clitellum absent in some specimens, partially developed in others, and enormously thick in a few, including segments XIV-XXII, and in addition part of XIII, usually its middle and posterior annuli ; when only partially developed, the glandular development is wanting in the median ventral line for a space extending outwards on either side a little beyond the second row of setæ, but in other cases the ventral surface not occupied by the ridges is modified so as more or less completely to surround these, but for which the clitellum would be complete all round. Between XIV and XV, and between each pair of succeeding segments as far back as XXI-XXII is a lighter-coloured ridge taking in the last annulus of the anterior and the first annulus of the posterior of the two segments between which it occurs, and extending outwards on each side a little beyond the second row of setæ and to the ventral margins of the girdle, except in the case of the fourth and fifth which do not extend outwards so far and between which is a slight ridge on which are situated the two small papillæ carrying the male pores, which correspond in position with the intervals between the first and second setæ on each side, or are slightly ventrad of the latter.

The two oviduct pores on XIV, in front and a little ventrad of the first seta on each side, and about 3 mm. apart.

Spermathecal pores five pairs, a pair between each two segments from IV to IX, ventral in position and in line with the first seta on each side.

Dorsal pores commence between XII and XIII.

Nephridiopores form a sinuous series of pores situated close to the anterior margins of the segments commencing with segment II ; on the whole they may be said to be dorsad of the fourth row of setæ, but as both the setæ of this row and the nephridiopores.

independently form sinuous series, the latter may on some segments be in line with or ventrad of the outermost setae on these segments, and in a few instances the nephridiopores were in line with the third seta on each side. Some of them are as much as 5 mm. dorsad of the fourth seta, and not very far from the median dorsal line; sometimes they alternate irregularly for some distance, at other times they form short ascending and descending series.

Alimentary canal: the very muscular pharynx and the short oesophagus occupy about the first four segments; the large gizzard is in v; in the next two segments the small intestine is narrow and white, while in segments viii to xvi, especially in the last two or three of these, the portion in each segment is globularly dilated and very vascular, some of them probably functioning as calciferous glands (in one specimen white masses effervescent on the addition of acid were found in all but the first of these segments), but there are no kidney-shaped diverticula as in *N. camdenensis*; the large intestine commences about xix, without any very marked increase in calibre, much folded and convoluted

From the posterior one of v to the posterior one of xii the mesenteries are very thick ; they are braced together and to the body wall by very thick cords, very noticeable in the case of the first complete one—the anterior one of v.

The segmental organs comprise a pair of coiled tubules in each segment after the second, each tubule consisting of a proximal fairly straight thick-walled portion longer (sometimes twice as long or even more) in some segments than in others according to the position of the pore, a short vesicular middle portion whose distal end lies close to the nerve cord, and a long ciliated glandular distal portion folded on itself and convoluted so that the loop reaches outwards a little beyond the commencement of the middle portion, while its ciliated anterior extremity, which is without any conspicuous "funnel," lies somewhere near the junction of the middle and distal portions.

*Hab.*—Thomas's Plains, N. E. Tasmania.

For all my examples of this fine species I am indebted to Mr. Alex. Morton, Curator of the Tasmanian Museum, who very kindly sent me both living and spirit specimens, discovered by Mr. Bernard Shaw, Inspector of Police. The worms of this species are readily distinguishable by the five pairs of spermathecae, and the numerous clitellar ridges ; they are remarkable for their thickness, for while they are much shorter than, and comprise less than half the number of somites met with in, the big *Notoscolex* from Gippsland, they fairly rival it in thickness ; and are much more robust and massive than the worms of the smaller *Notoscolex*, than which they have fewer somites.

NOTOSCOLEX TUBERCULATUS, n. sp.

A dozen (spirit) specimens vary from 9 cm. (a young individual) to 25 cm. in length, 5-7 mm. in breadth ; the number of segments from about 250-280.

Colour (in spirit) uniformly pale flesh-coloured ; body cylindrical.

Prostomium broad, slightly depressed, only partially dividing the buccal ring (about half). Segments II-IV biannulate, after which they are tri-annulate, the anterior annular groove for a few segments less conspicuous.

Setae in eight longitudinal rows, forming four series of couples; the two innermost rows about 3 mm. apart; the second row on each side slightly less than 1 mm. from the first; the third about 2 mm. from the second; the fourth about 1 mm. from the third, the distance between these slightly greater than that between the setae of the first couple.

Clitellum (in one case) commences with XIII, (the anterior or even this and the median annuli not included in all of them) and includes the first and second annuli of XVIII (probably the whole of this segment when the worms are breeding), thick and complete all round except for the fossae on its posterior ventral portion; absent altogether in some of the specimens, and among some of the others in various stages of

Dorsal pores commence between XII and XIII, not always visible on the clitellum ; nephridiopores not visible.

Alimentary canal : the pharynx occupies about the first four segments ; the short œsophagus leads to the large gizzard in V ; in segments V and VI are two pairs of conspicuous tufts of tubules which may be salivary glands ; calciferous pouches seem to be absent but in XII and XIII the canal is globular and vascular possibly representing calciferous glands ; the large intestine commences in XVIII.

Genitalia : two pairs racemose vesiculæ seminales, a pair in each of segments IX and XII ; testes and ciliated rosettes two pairs of each, in X and XI ; two prostates in XVIII, each of them a long narrow linear gland compacted into a mass, and proximally narrowing into the rather long S-shaped genital duct ; the vasa deferentia not visible ; lying beside the proximal portion of each genital duct is a pair of minute sacs, each containing a long tapering curved penial seta. The ovaries and oviducts have the usual situation and relations ; spermathecæ two pairs, in VIII and IX, pear-shaped pouches, with a narrow stalk or duct about half as long as the pouch, at the junction with which is a small knob-like rudiment of a cæcum.

Six mesenteries commencing with the one between VII and VIII are thicker than the others.

The last pair of hearts is in XII.

The segmental organs are delicate folded tubules, a pair to each segment, except some of the anterior ones.

In segment XVII, and also in XX and two or three following segments on either side of the nerve cord is a small white hemispherical elevation, in relation with the external copulatory papillæ.

*Hab.*—Warragul, Gippsland, Victoria.

The worms of this species are remarkable for their slenderness. In appearance at first sight they resemble those of several species of *Cryptodrilus*, or as the setæ are not conspicuous, and accessory copulatory structures are, even *Perichæta Coxii*.

The best of my specimens are only just intrac clitellian, and no more ; possibly when the girdle is fully developed it may include the

whole of segment XVIII. Hence it seems to me that the chief difference between the genera *Notoscolex* and *Cryptodrilus* is becoming narrowed down to the question of segment XVIII being included in the girdle. I begin to suspect therefore that when I come to revise the species already described, with additional material to work upon, it may be necessary to include the latter in the former genus, or at any rate to regard it as a sub-genus; and to deal with *Didymogaster* in a similar same manner, viz., to treat it as a sub-genus of, or include it in *Digaster*. Under any circumstances the name *Didymogaster* will have to be changed, as, since I made use of it, I find that it is already pre-occupied for a genus of insects.

CRYPTODRILUS MEDITERREUS, n. sp.

Ten (spirit) specimens are from 7.3 to 11 cm. long, 4-5 mm. broad, and comprise from 130-150 segments. A young specimen 4.2 cm. long, and 2½ mm. wide comprises 132 segments.

Colour above sooty-brown, darkest in the anterior portion of the body, especially in front of the clitellum, lighter below, the

Male pores two, on conspicuous papillæ on xviii, slightly dorsad of the second row of setæ on each side. Oviduct pores two, in front and a little ventrad of the first seta on each side; spermathecal pores three pairs, a pair between each two segments from vi-ix, in line with the second seta on each side. Accessory copulatory structures comprise a swollen ventral portion of vi to ix; a pair of circular swellings on the ventral surface of each of segments x and xi; and on the anterior margin of xviii and of xix and ventrad of the male pores is what may be a pore on each side.

The nepridiopores are close to the anterior margins of the segments commencing with the second one, and form two irregularly alternating series on each side, one at the level of the fourth, the other at first at that of the third setæ, (the first two or three pairs are at the former level, and occasionally, especially in the anterior region, the pores may continue at the same level for several consecutive segments); behind the clitellum the inner rows are at the level of the second setæ, and are visible only on alternate segments, an arrangement which I am at present unable to reconcile with the presence of consecutive pairs of nephridia in this region.

Dorsal pores after segment v or vi.

Alimentary canal: the gizzard is in segment v; each segment from x to xiii contains a pair of calciferous pouches, which lie at the side of and somewhat below the alimentary canal the overlying portions of which have the lumen dilated; the large intestine commences in xviii.

Genitalia: in each of segments xi and xii a pair of racemose vesiculæ seminales (very small in all the specimens dissected); segments x and xi, which were partially filled with masses of spermatozoa, contain the two pairs of ciliated rosettes [and probably the true testes, but their identification was not perfectly satisfactory]; the two prostates are lobulated compressed bodies occupying part of four or five segments, xvii to xx or xxi; the vasa deferentia join the prostatic ducts, which come off about the middle of the glands, a little way from the latter;



the genital duct then gradually increases in calibre, and is bent in U-shape, the limbs lying close together, and the convexity of it looking backwards; beside the proximal portion of each genital duct is a pair of small white sacs, each of which contains a delicate tapering curved penial seta about 2.5 mm. long, minutely spinose towards the curved tip. The ovaries and oviducts have the usual situation and relations: the three pairs of spermathecae are in segments VII-IX, and are stalked pouches, each with a very rudimentary club-shaped caecum coming off at the junction of the stalk and the pouch.

The last pair of hearts is in XIII.

The nephridia are two series of pairs of tubules; those corresponding with the outer rows of pores look like small vesicles, and are in alternate segments; those of the second series have the usual situation, and are delicate and convoluted, a pair in each segment except some of the anterior ones, but I have not succeeded as yet in finding a corresponding consecutive series of nephridiopores.

Setæ in the anterior region of the body longer, stouter and further apart, on the preclitellar segments 22 per segment; at about xv the number increases to 28 or 30, and still further back to about 36, but in some cases if not usually the last few segments seem to be smooth and setæ are not visible; in the median dorsal and ventral regions is an interval devoid of setæ, the dorsal interval slightly the narrower, in each case between twice and thrice the width of an interval between two setæ in the same region. The rows of setæ are frequently not quite straight, though this may perhaps be due to unequal contraction of the parts of the body, or to the accidental absence of some of the setæ.

Girdle not developed in any of the specimens, but evidently comprising xiv-xvi together with a portion of each of segments xiii and xvii, as in nearly all the specimens the segments mentioned are differently coloured.

Male pores two, not on papillæ in any of the specimens, corresponding with the interval between the first and second setæ on each side. Oviduct pores two, in front and slightly ventrad of the first seta on each side. Spermathecal pores five pairs, on the anterior margins of segments v-ix, ventral, in line with or slightly dorsad of the first seta on each side.

Dorsal pores commence after segment iv. Nephridiopores not visible. Accessory copulatory structures comprising pairs of pores, each pair usually on a ridge, at the junctions of xvii-xviii, xviii-xix, xix-xx, and xx-xxi, the first two pairs ventrad of the male pores, the others in line with them.

Alimentary canal: the gizzard is in segment v; in each segment from ix to xiv or xv the intestine has its lumen dilated and its walls vascular but there are no diverticula; the portion in xvi is very narrow, and the large intestine begins in xvii.

Genitalia: vesiculæ seminales two pairs, one pair in ix and one in xii, the intervening segments containing the true testes and the ciliated rosettes as well as a large quantity of spermatozoa; the

two prostates occupy XVIII and XIX, each of them being a long narrow body coiled into a compact mass, the duct coming off from the anterior portion of the gland, (the junction with the vas deferens not visible), the genital duct fairly long and U-shaped. The ovaries and oviducts have the usual situation and relations; the spermathecae are five pairs of stalked pouches opening anteriorly in segments V-IX, each with a short but distinct club-shaped caecum only about  $\frac{1}{3}$  the length of the pouch. Lying beside the proximal portion of the genital duct is a small white body, its distal extremity attached to the body wall by a ligament; this is a sac containing a thin curved penial seta.

The segmental organs consist of small and delicate folded tubules, a pair in each segment except a few anterior ones.

The last pair of hearts in XII, this and the two preceding pairs the largest.

*Hab.*—Warragul, Gippsland, Victoria.

*Figures 1-10.*—Fig. 1, head; 2, prostates; 3, spermathecae; 4, ovaries; 5, oviducts; 6, hearts; 7, nephridia; 8, nephridia; 9, nephridia; 10, nephridia.



interval between two setæ in this region ; a well-marked dorsal interval also, somewhat narrower than the ventral one, about twice the interval between two setæ in the dorsal region.

Clitellum comprises three complete segments, XIV-XVI, and part of XVII, complete all round ; wanting in the smallest specimen.

Male pores on conspicuous papillæ, just ventrad of the third seta on each side.

Oviduct pores two, on XIV, one on each side of median line. Spermathecal pores four pairs, between each two segments from V to IX, in line with about the eighth seta (the rows of pores are not quite straight and there may be two or three setæ dorsad of them) and therefore dorsal in position, so that they are visible when the worm is looked at from above.

Dorsal pores commence after segment IV. Nephridiopores not visible.

On the anterior margins of X and XVII a pair of circular depressions with raised and swollen margins, one on each side, corresponding with the intervals between the first and second or second and third setæ ; these may be accessory copulatory structures.

Alimentary canal : the gizzard may be in V, but being very large and the mesenteries behind it being very thin it seemed to be in VI ; from VIII to XIV there are globular, vascular dilatations which are probably calciferous glands, but there are no diverticula ; the large intestine commences in XVII.

Genitalia : vesiculæ seminales three pairs, in IX, XI and XII ; true testes and ciliated rosettes two pairs, in X and XI ; prostates two, occupying part of two segments, XVIII and XIX ; genital ducts rather long, S-shaped ; the vasa deferentia join the prostatic ducts close to the prostates, the latter coming off just behind the anterior extremities of the glands. Ovaries and oviducts as usual ; spermathecæ four pairs, quite dorsally situated, of which the first pair is in VI and the last in IX, long slightly tapering pouches, each with a cæcum as long as or even slightly longer than itself.

Six mesenteries commencing with the one between VIII and IX are noticeably thicker than the others.

The last pair of hearts in XIII.

Minute inconspicuous tufts of tubules distributed over the walls of the body cavity seem to be segmental organs.

*Hab.*—Warragul, Gippsland, Victoria.

This species is readily distinguishable from *P. secunda*, the only other Australian species having four pairs of spermathecae and interrupted circles of setae yet described, by the dorsal position of the spermathecal pores.

## NOTES AND EXHIBITS.

The Hon. James Norton exhibited a remarkable fungus growing on the branch of a *Syncarpia*; also flowering specimens of the common Bamboo, gathered from a tree in Hyde Park.

Mr. Palmer exhibited two "letter-sticks" obtained from the Aborigines of the Gascoigne River district, where, as in other parts of Australia, they are used for inter-tribal communication.

Dr. Haswell exhibited a series of preparations illustrating the embryology of birds.

Dr. Katz exhibited, in connection with his paper, pure cultures of the pigment-producing micrococcus described. He took occasion to point out one characteristic feature in these cultures, viz., their exclusively aërophile nature. He also exhibited under the microscope a few slides of the tissue-sections mentioned.

Mr. Macleay exhibited a specimen of *Erythrichthys nitidus* of Richardson, described in the 'Voyage of the Erebus and Terror,' from West Australia. He had received the fish from Mr. Morton of the Hobart Museum. It had been captured on the South Coast of Tasmania.

Mr. Fletcher exhibited for Baron von Mueller, F.R.S., &c., a drawing of an aquatic plant, *Aldrovanda vesiculosa*, Linn., and in reference to it stated that the Baron wished to call the attention of the members of this Society to the desirability of keeping a look-out for this plant, which the late Mr. P. O'Shanesy, F.L.S., found some years ago in a lagoon near Rockhampton, and which may be looked for in N.S.W. among water-plants such as *Utricularia flexuosa*. Though rendered known as a South European plant so long ago as 1747, the fruit of *Aldrovanda vesiculosa* is still unknown. The Baron would also be glad if members would try to discover the fruits of the native species of *Lemna*.

WEDNESDAY, 26<sup>TH</sup> OCTOBER, 1887.

---

The President, Professor W. J. Stephens, M.A., F.G.S., in the  
Chair.

---

Mr. Woodford was present as a visitor.

---

"The Quarterly Journal of the Geological Society of London." Vol. XLIII., Part 3 (No. 171), 1887. *From the Society.*

"The Proceedings of the Royal Society of Queensland, 1886." (Vol. III). *From the Society.*

"Transactions and Proceedings of the Royal Society of Victoria." Vols. II.-V., VII., VIII. (Part 2), IX. (Part 2), X.-XVIII. (1857-1882). *From the Society.*

"Abstracts of Proceedings of the Royal Society of Tasmania," (15th August and 10th October, 1887). *From the Society.*

"Woods and Forests of Tasmania—Annual Report, 1886-7 ;" "Report on Saw-Mill Reservations ;" "Report on Macquarie Harbour Pine and other Timber Trees of the West Coast." By George S. Perrin, F.L.S., Conservator of Forests. *From the Conservator of Forests.*

"Zoologischer Anzeiger." X. Jahrg., Nos. 259 and 260 (1887). *From the Editor.*

"Feuille des Jeunes Naturalistes." No. 203 (September, 1887). *From the Editor.*

"Journal and Proceedings of the Royal Society of New South Wales." Vol. XXI., Part 2 (1887). *From the Society.*

"Bericht über die Senckenbergische naturforschende Gesellschaft in Frankfurt am Main, 1887." *From the Society.*

"Mémoires de la Société des Naturalistes de la Nouvelle-Russie, Odessa." Tome XII., Part 1 (1887). *From the Society.*

"Proceedings of the Royal Society of London." Vols. XL (No. 245) ; XLI. (Nos. 246-250) ; XLII. (Nos. 251-255). (May, 1886 to May, 1887). *From the Society.*



"Annales de la Société Royale Malacologique de Belgique." Tome XXI. (1886); "Procès-Verbaux des Séances" (January to June, 1887). *From the Society.*

"Australian Orchids." By R. D. Fitzgerald, F.L.S. Vols. L. II. (Parts 1 and 2). *From the Board of International Exchanges of Literary and Scientific Works, Official Publications, &c., through R. C. Walker, Esq.*

"Archives Néerlandaises des Sciences exactes et naturelles." Tome XXII., Liv. 1 re. (1887). *De la part de la Société Hollandaise des Sciences à Harlem.*

"The Scottish Geographical Magazine." Vol. III., No. 9 (September, 1887). *From the Hon. W. Macleay, F.L.S.*

"Descriptions of two new Fishes." By Alexander Morton, Curator of the Tasmanian Museum. *From the Author.*

"Annalen des k. k. naturhistorischen Hofmuseums, Wien." Bd. II., No. 2. *From the Director.*

"The Victorian Naturalist." Vol. IV., No. 6 (October 1887). *From the Field Naturalists' Club of Victoria.*

"Proceedings of the Academy of Natural Sciences of Philadelphia, 1886." Parts II. and III. (April-December). *From the Academy.*

"Johns Hopkins University, Baltimore—Studies from the Biological Laboratory." Vol. III., Nos. 5-8 (1886); "University Circulars." Vol. VI., Nos. 52-55; "Eleventh Annual Report" (1886). *From the University.*

"United States Geological Survey—Fifth Annual Report to the Secretary of the Interior" (1883-84). By J. W. Powell, Director; "Mineral Resources of the United States, 1885." *From the Director of the United States Geological Survey.*

"Annals of the New York Academy of Sciences." Vol. III., Nos. 11 and 12 (Sept. 1886); "Transactions." Vol. V., Nos. 7 and 8 (April-May, 1886). *From the Academy.*

"American Museum of Natural History, New York—Bulletin." Vol. I., Nos. 1-3 and No. 8; "Annual Reports" (1870-82). *From the Museum.*

"Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien" (1886). XXXVI. Bd., Pts. 3 and 4. *From the Society.*

"The Journal of the Linnean Society of London—Botany." Vol. XXII. (Nos. 145-149); XXIII. (No. 151); XXIV. (No. 158); "Zoology." Vol. XIX. (Nos. 114 and 115); XX. (Nos. 116 and 117); XXI. (Nos. 126-129); "Proceedings" (November, 1883 to June, 1886; November, 1886 to June, 1887); "List of Members, &c." Session 1886-7. *From the Society.*

"Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg." Tome XXXI., Nos. 2 and 3 (1886); "Mémoires." T. XXXIV., Nos. 5-13 (1886). *From the Academy.*

"Oefversigt af Finska Vetenskaps-Societetens Förhandlingar." T. XXVII. (1884-85); "Bidrag till Kännedom af Finlands Natur och Folk." Häftet 43 (1886); "Exploration Internationale des Régions Polaires, 1882-84.—Expédition Polaire Finlandaise." *From the Society of Sciences of Finland.*

PAPERS READ.

## FURTHER REMARKS ON PHOSPHORESCENT BACTERIA.

BY DR. OSCAR KATZ.

In the course of my investigation of phosphorescent bacteria from sea-water, I have been able to obtain three more kinds, in addition to the three of which I gave a preliminary account at the Meeting of this Society, in June last.\* As a detailed description of their morphological and biological properties will not be forthcoming for some time yet, I may be permitted to give some few outlines of these new species. Generally speaking they are, as before, easily cultivable on or in a variety of nutritive substances, of which certain marine animals (fishes, etc.), must especially be mentioned, and added to common sea-water they can render it luminous just as the organisms already alluded to (l.c.)

### I. (IV).

The first kind—or the fourth, continuing the succession—which I propose to name *Bacillus argenteo-phosphorescens liquefaciens* (rather a long specific name), was secured in a sample of sea-water from Bondi Bay, a few miles south of Sydney, on the 11th September last. By mixing 10 drops of this water with liquefied gelatine in a test-tube, and causing the mixture to solidify along the inner walls of the tube, I noticed, among others, after some time several luminous colonies of the bacillus.

It forms short straight, now and then slightly curved, rods of about .002 mm. in length, and about  $\frac{1}{3}$  of it in width (this is according to stained cover-glass preparations taken from agar-agar

---

\* See Proceedings of this Society, Vol. II. Series 2nd. Part 2, 1887, p. 331.

cultures; in the living state the bacilli present, of course, somewhat larger proportions). The extremities are rounded off. Cultivated in a suspended drop of nutrient meat-broth on hollow-ground slides, the bacilli exhibit an extremely lively mobility; they grow abundantly to filaments, which are more or less elongated, and variously wound or curved.

They are easily and uniformly stained by means of alkaline methylene-blue.

Their cultures in alkaline nutrient gelatine, a very suitable medium for the cultivation of the micro-organism at ordinary temperatures, cause it to become liquefied. In such a gelatine they yield characteristic colonies, which are different from those of *Bacillus cyaneo-phosphorescens* (l.c. p. 334), and which will be described later on.

The light emitted by their cultures on gelatine, agar-agar, or boiled fish, in the dark, is of a silvery colour, but weak, and insufficient to enable one to read, for instance, the watch. It is the

Cant., *H. melanocheir*, Cuv. and Val.), purchased at the same time and from the same place. These fragments of squid and gar-fish, after having been moistened with sea-water, and placed in a moist chamber, were found to be phosphorescent all over in the evening of the very day on which they were put aside. Cultures of the luminous mucus at the surface of these objects yielded, among numerous other ones, some colonies of this bacillus; but in a tube of gelatine mixed with some of a salt-infusion of the material from the squid, there appeared one other colony which consisted of the micro-organism next to be mentioned.

*Bacillus argenteo-phosphorescens* II. shows in cover-glass preparations from gelatine cultures, short, always straight rods, with their ends rounded; length up to about .0027 mm., yet most of the rods in the preparations are shorter; width about .00067 mm. In a drop of nutrient meat-broth they do not exhibit spontaneous movements; besides individual bacilli and diplo-forms, threads made up of few links, and short filaments in which there is no interruption, occur.

They stain well and uniformly with alkaline methylene-blue.

They do not cause liquefaction of the gelatine which serves as nutritive soil to them.

The light given off from pure cultures of this microbe is of a bright silvery colour, and is somewhat more intense than that of *Bacillus argenteo-phosphorescens* (l.c., p. 333); this is especially noticeable in cultures on boiled fish at 21°-24° C., and then also it may be noticed that the colour of the light emitted by the former is greenish-silvery.

On the ground of morphological and physiological characters the organism under consideration is distinguished from that referred to; for instance, it is very easy to demonstrate this difference by means of streak-cultures on gelatine, where in the one case (*B. arg.-phosph.* I.), a flat, waxy yellow ribbon with glassy lustre is produced, whereas in the other (*B. arg.-phosph.* II.), the ribbon has a whitish colour with less prominent lustre, which is rather of a greasy appearance.

## III. (VI).

The third (or sixth) kind was derived from a luminous fragment of squid, as already noticed above. As name for it I propose *Bacillus argenteo-phosphorescens* III. Under high powers it exhibits pretty much the same proportions of length and width as that of the former kind. In cultures in nutrient meat-broth the rods are seen to be motile; they form, here and there, short threads.

Alkaline methylene-blue is readily and uniformly taken up by them.

By growing them on or in gelatine, the latter does not become liquefied.

With regard to the light which their cultures emit in the dark, it may be said that it resembles, on the whole, that of the two kinds, named *B. argenteo-phosphorescens* I. and II., more especially the latter. But, in other respects, there are considerable differences between these two and the present one. Here I need only

ON A NEW GENUS AND SPECIES OF LABROID FISH  
FROM PORT JACKSON.

BY E. PIERSON RAMSAY, F.R.S.E., &C., AND J. DOUGLAS-OGILBY.

(*Notes from the Australian Museum.*)

EUPETRICHTHYS, gen. nov.

Branchiostegals six : pseudobranchiæ present. Body elongate and compressed. Gill-membranes attached to the isthmus. Pre-opercle entire. Jaws with a pair of curved canines anteriorly, and a lateral row of conical teeth : posterior canine present. Dorsal fin with nine spines and twelve rays : anal with three spines and eleven rays ; ventral fins with an elongated ray. Scales cycloid, large : opercle and cheek scaly. Lateral line continuous.

From the above diagnosis it is evident that the true position of this fish belongs to that group of *Labridæ* to which Dr. Günther (Brit. Mus. Cat. iv. p. 66) has given the name *Julidina*, and a glance along the different sections of that group shews that its place is among those having "nine dorsal spines, the lateral line not interrupted, and the cheeks and opercles scaly." Its close affinity to *Labrichthys*—that most numerous represented genus of Labroids on our shores—is at once apparent, but in such a genus where the fin formula remains constant throughout the whole series of about thirty \* species, any departure from the normal number must necessarily carry with it a greater weight than among fishes which enjoy a greater latitude in this respect. This difference therefore coupled with the elongate ventrals and general form have induced us to raise this new species to generic rank under the above name, placing it in the system between the genera *Labrichthys* and *Labroides*.

---

\* The examination of a more extended series of specimens will probably reduce this number somewhat.



*EUPETRICHTHYS ANGUSTIPES*, sp. nov.

B. vi. D. 9/12. A. 3/11. V. 1/5. P. 12. C. 14. L 1. 25.  
L. tr. 2/9.

The length of the head is contained five times in the total length; the greatest height of the body, which is behind the origin of the anal fin, five and a-half times; the height of the head at the nape is five-sevenths of its length; the greatest breadth one half of the same. The eye is situated almost entirely above the middle of the side of the head, but does not encroach upon its upper profile; it is of small size, its diameter being contained four and three-fifths times in the length of the head; the snout is moderately obtuse and is one seventh longer than the diameter of the eye; the interorbital space is four fifths of the same, and is convex, as also is the upper profile of the head. The jaws are of equal length, and the lips of moderate thickness; the cleft of the mouth, which is almost horizontal, is small, the posterior extremity of the maxillary barely reaching to the eye. The preopercular bones are entire. *Teeth* — A pair of strong anterior canines in each jaw, those of the lower being sub-horizontal and received between those of the upper, on each ramus of the mandible there are ten, and of the maxilla nine, conical teeth, the anterior one being the strongest, and the others decreasing in size by regular gradations; there are no perceptible teeth behind these; posterior canine present.\* *Fins* — the dorsal fin commences slightly in front of the lobe of the opercle; its spines are weak, and considerably lower than the rays, the last of which is nearly double the length of the last and longest spine, which is itself two-fifths of the length of the head. The anal fin commences beneath the anterior dorsal ray; its spines are rather stronger but not so long as those of the dorsal, and the third and longest is only three-sevenths of the posterior ray, which exceeds in length the corresponding ray of the dorsal fin; the last ray in both these fins is divided to the very base. The ventral fin

\* In our specimen there are two posterior canines on one side, and only one, as is usual, on the other, but, as the same discrepancy not unfrequently occurs in the allied genus *Labrichthys*, no stress need be laid upon its occurrence in this case.

originates beneath the middle of the base of the pectoral; its spine is midway in length between the longest of the dorsal and anal fins, and is one-third of the first ray, which is elongate, reaching to the origin of the anal, and equal in length to the head; the second ray is much shorter than the first, and, while the third is but little more, the fourth and fifth are considerably less, than the spine. The pectoral fins are short and rounded, two-thirds of the length of the head, and reaching to the vertical from the seventh scale of the lateral line. The caudal fin is rounded, and is of equal length with the head: the length of the free part of the tail is three-fifths of its height between the terminations of the dorsal and anal fins. *Scales*—those on the opercle are almost as large as those on the body, and form three irregular rows, while those on the cheek are much smaller, and comprise about ten scales in a single row, which does not quite cover the cheek, and extend from behind to beneath the middle of the eye: there are three sets of scales between the occiput and the origin of the dorsal fin, and a similar number between the dorsal and caudal fins. The bases of the dorsal and anal fins are naked, but the caudal is clothed for fully half its length with small oblong scales. The lateral line rises with a gentle curve to beneath the fourth dorsal spine, and from thence has an almost imperceptible downward slope to beneath the tenth ray, where it drops suddenly down to the centre of the tail, leaving four scales on the lateral line between the flexure and the caudal fin, the last of which is on that fin, and is much enlarged. The anterior scales are simply branched by a single offshoot rising near the middle of the main tube on each side and thus forming an almost rectangular cross; from thence to the end of the flexure they bear from five to eight (and even ten) branchlets, most of which rise from the upper side of the main tube; behind this the branching again decreases. *Pores*—the upper surface of the head is studded with small circular pores, while the preorbital and preopercle are supplied with raised tubular pores, which are frequently arbuscular. *Colors\**—upper half of body dark green, lower half yellow with

---

\* Taken from the living fish.

seven purplish transverse bands, darkest inferiorly, where they are much broader than the interspaces, and even coalesce on the abdominal region, which is further ornamented with brilliant violet spots and streaks; upper part of head paler than the back: a narrow violet band runs obliquely downwards from the eye to the middle of the maxilla; a second parallel to this just touches the end of the maxilla, but does not quite join the corresponding band on the opposite side; a third, which is much fainter, runs from the antero- to the postero-inferior angle of the orbit, forming a semicircle, which encloses a purple spot; there are two more narrow pinkish vertical bands descending from the cheeks to the isthmus, which is of a pale blue color: the lower part of the opercle is purple, and there are several round spots of the same color behind the eye. Dorsal fin pale red with a brilliant blue spot between the two first spines, and the outer half of the web of the three first orange with narrow pale blue longitudinal streaks, an olive-green band, broadest posteriorly, runs along the outer half of the entire length of the fin, but only touches the margin on the last two or three rays; below this are numerous carmine spots and short oblique streaks, while above it are numbers of small circular pale blue spots. Anal fin similar but paler, with the olive-green band suffused over the entire outer half, and ornamented with oblique wavy blue lines, which sometimes form reticulations, carmine spots as in dorsal fin. A broad olive submarginal and a grey marginal band on the caudal fin, both of these being traversed by pale blue arcuate waved lines, the enclosed space being salmon-color with carmine spots on the rays. Pectoral fins hyaline. The outer ventral ray saffron with a narrow blue margin. Irides brown and silvery with a narrow edging of orange on the inside.

For the pleasure of describing this most beautiful fish we are indebted to the commendable liberality of the proprietors of the Royal Aquarium, Bondi, who handed to us the living fish on its being pointed out that it was of a species unknown to us. Its total length is about 6.25 inches, and we are informed that it was obtained at Rose Bay, Port Jackson, on the 8th inst. Register number I. 1418.

## MISCELLANEA ENTOMOLOGICA, No. V.

### "THE HELÆIDES."

BY WILLIAM MACLEAY, F.L.S., &c.

*(Continued from page 550.)*

In my last Paper on this subject, I gave descriptions of all the known species of the winged genera of the sub-family. In the following I shall deal with the apterous genera of the same sub-family.

These consist of the genera *Helæus*, *Sympetes* and *Saragus*. I shall take them in the order in which I have now placed them.

#### Genus HELÆUS, Latr.

Head entirely immersed in the thorax, scarcely narrowed, truncate in front, depressed on the forehead. Eyes of variable size. Antennæ in general as long as, or a little more long than the thorax, their four last joints sub-globose, perfoliate, and forming a tolerably distinct mass. Thorax moderately transversal, parabolically rounded on the sides, narrowly and profoundly emarginate in front with the anterior angles prolonged and crossing in front of the head; the base imperfectly contiguous to the elytra, bisinuate, with a large median lobe of variable form; the foliaceous margin of great breadth and reflected. Elytra oblong-oval or oval, convex on the disk, the foliaceous margins of variable breadth and reflected. Legs long, tibiæ finely rough, one spur to the anterior and two to the four posterior tibiæ, sometimes very small. Metasternum very short, mesosternum declivous, broadly concave, prosternal prominence curved behind, sometimes prolonged into a short point. Body apterous.

This genus, which gives its name to the sub-family, contains in itself in the most exaggerated degree all the peculiarities of the group. The thorax enclosing the head ; the broad, flattened form, and the large expanded upturned margins, are very largely more conspicuous in the species of this genus than in any of the others. The greater number of the species are from South Australia, the Swan River settlement, and the interior. I think it may be classed generally as an inhabitant of the dry and barren plains of the far interior.

I propose to group the species into those with—

1. The elytra smooth or only granulate.
2.   "   "   pilose.
3.   "   "   bicostrate.
4.   "   "   tuberculate.

1. ELYTRA SMOOTH OR ONLY GRANULATE.

61. *HELEUS COLOSSUS*, De Brême.

Long. 16 lines, lat.  $10\frac{1}{4}$  lines.

*Hab.*—Queensland (7).

If I am correct in my identification of this insect, its habitat is Queensland; I have specimens of what I take to be it, from Rockhampton and Victoria River (Mitchell's Exp.).

62. *HELEUS INTERMEDIUS*, De Brême.

Mon. Cossyph. I. p. 61, pl. V. fig. 1.

Broadly ovate, black, nitid, glabrous. Head slightly rugose, elongate, square in front, the clypeus convex and a little emarginate in front, as well as the labrum. Antennæ as in *H. Colossus*. Thorax somewhat granulose, transverse and a little sinuate behind, the sides rounded towards the base, and conspicuously narrowed and emarginate in front; the disk is very slightly convex and presents many depressions and inequalities, on the base of the median line a strong erect spine a little curved backwards; the margins broad particularly laterally, turned up on the edge, the posterior angles recurved, the anterior rounded and crossing. Elytra oval, nitid, with a scarcely visible scattered granulation, the disk oval, convex, a little prolonged backwards, the suture raised into a strong carina; on each elytron near the scutellum a very slightly prominent and oblique costa not even reaching to the first third of the elytra. The margins as large at the base as that of the thorax, and rather narrower towards the apex. Body beneath of a deep brown and punctate; tibiæ rough.

Long. 13 lines, lat. 8 lines.

*Hab.*—South Australia.

63. *HELEUS PRINCEPS*, Hope.

Trans. Ent. Soc. Lond. 1848, Vol. V. p. 52, pl. VI. fig. 1.

"Fuscus, disco in medio nigricante, marginibus pallidioribus seu rubro-fuscis, pedibusque concoloribus. Thorax antrosum rotundatus (angulis anterioribus complicatis); foramen antice

latius quam longius, postice tuberculo elevato nigricanti, foramine utrinque satis conspicuo. Elytra late ovalia, postice rotundata, medio disci atriori, suturaque elevata, sexque punctatis lineis elevatis in singulo apparentibus, marginibus late piceo-fulvia, punctisque atris elevatis sparsim aspersis. Corpus infra fusco-brunneum. Pedes concolores."

Long.  $15\frac{1}{2}$  lines, lat.  $9\frac{3}{4}$  lines.

*Hab.*—Swan River.

I have given Mr. Hope's description in full, not that I regard it as by any means a satisfactory description, but because I may be wrong in giving Mr. Hope's name to the insect described below, but which I think must be identical with it.

Very broadly ovate, black, sub-opaque. Head very minutely punctate, eyes very transverse, approximate. Clypeus very broadly and lightly emarginate. Thorax transverse, very broadly margined, the margins reddish, largely hollowed out and reflected, and

64. *HELÆUS BROWNII*, Kirby.

Trans. Linn. Soc. Lond. Vol. XII. p. 467, pl. XXIII. fig. 8—*Brême*, Mon. Cossyph. I. p. 82, pl. VI. fig. 6.—*Boisd.* Voy. de l'Astrol. p. 261.

Ovate, black, or brownish black, very nitid, glabrous. Head granulate, clypeus convex, turned up on the border, emarginate anteriorly, the labrum salient not emarginate, forehead elevated with a slight longitudinal groove between the eyes; the eighth joint of the antennæ large and round, the ninth and tenth not so swollen, the last oval and reddish. Thorax transverse, rounded, smooth and not much sinuated posteriorly; the disk feebly carinated, moderately convex, with several depressions and irregularities, and a small erect spine at the base of the median line; the anterior angles crossing and rounded, the posterior very much curved backwards; the margins broad, raised, very minutely punctate, and folded back at the borders. Elytra oval, the disk convex and scarcely visibly granulate, the suture carinate; on each side of the scutellum a short slight depression or fovea, the margins raised and folded on the border, as broad as those of the thorax towards the base, narrower on the sides and apex and convex at the humeral angles, which are a little prominent. Under surface and legs brown; tibiæ rugose.

Long. 10 lines, lat.  $8\frac{1}{2}$  lines.

*Hab.*—Swan River, W. Australia.

65. *HELÆUS INTERIORIS*, n. sp.

Oblong-oval, black, sub-opaque. Head very minutely punctate, the clypeus and labrum slightly emarginate. Thorax minutely and roughly punctate, the margins very broad and much reflected, the anterior angles broadly rounded and crossing in front of the head leaving the opening over the head nearly circular, the posterior angles much recurved backwards; the disk is small, slightly convex and uneven, with a strong, erect, conical tubercle in the middle near the base. Elytra at the base about the width



of the thorax at the base, but expanding behind, the margins very broad, a little reflexed, and rather thinly granulate, the disk carinate at the suture, and on each elytron about eleven or twelve irregular rows of more or less distant granules, the second row from the suture having the granules more continuous, and presenting near the base a costiform appearance.

Long. 12 lines, lat. 8 lines.

*Hab.*—Darling River.

66. *HELÆUS PALLIDUS*, n. sp.

The very pale yellowish-brown diaphanous appearance of this insect may possibly be due to its being very fresh from the chrysalis, but, quite apart from its colour, it is undoubtedly a very distinct species. In form it is not unlike *H. intermedius*. Head rather flat, punctate, canaliculate between the eyes, these approximate. Thorax transverse, very broadly margined, the margins very minutely punctate, much flattened out, and a little recurved on the edges; the disk is small, convex, and of a darker colour than the margins, which are very finely punctate, with no costiform appearance.

## 2. ELYTRA PILOSE.

67. *HELÆUS PERFORATUS*, Latreille.

Fam. Naturelle, 2nd Ed. Vol. II. p. 32, pl. III. fig. 6—Guérin et Perch. Gen. des Ins. 3 liv. N. 7, pl. XI.—Boisd. Voy. de l'Astrol. p. 361.—De Brême, Mon. Cossyph. I. p. 55, pl. VI. fig. 2.

Broadly ovate, black, sometimes a little violet black. Head advanced, subrugose, a little longer than broad, clypeus convex, the angle of the epicranium raised, the forehead canaliculate between the eyes; labrum salient, as well as the palpi. Antennæ about  $1\frac{1}{2}$  times the length of the thorax, the seventh joint slightly rounded, the two following globular, the last joint larger and pointed. Thorax transverse, sub-sinuated posteriorly, rounded on the sides and narrowed in front, the disk a little punctate, slightly convex, not perceptibly carinate, but with a perceptible tubercle on the median line towards the base, the margins very dilated, thin, recurved and very minutely granulate, the anterior angles dilated, rounded and meeting or slightly crossing in front of the head, the posterior angles pointing a little backwards. Elytra oval, a little dilated behind the humeral angles, rounded towards the apex, the disk very convex, oval, nitid, irregularly punctate, each elytron with four rows of long crisp hairs, these hairs are generally black, but sometimes reddish at the point, and planted in bundles; the margins are very dilated, a little larger than those of the thorax. The under surface entirely black and punctate. Legs black, tibiæ rugose.

Long.  $13\frac{1}{2}$  lines, lat.  $8\frac{1}{2}$  lines.

*Hab.*—South and Western Australia.

68. *HELÆUS KIRBYI*, Brême.

Mon. Cossyph. I. p. 57, pl. VI. fig. 4.

Very like *H. perforatus* but of a grayer black and a little less dull. Thorax more narrowed on each side and more strongly carinate, particularly towards the base where the median line is

elevated into an obtuse point, posterior angles salient and recurved backwards. Elytra dilated behind the humeral angles, narrowing a little towards the middle and apex, the disk very convex, oval, nitid, irregularly punctate, with on each elytron four rows of small tufts of reddish-brown hair, much thinner and shorter than in *H. perforatus* and with scarcely a trace of puncturation on the margins. In all else like *H. perforatus*.

Long.  $12\frac{1}{2}$  lines, lat. 8 lines.

*Hab.*—Swan River.

69. *HELEUS* SPENCII, Brême.

Mon. Cossyph. I, p. 58, pl. VI. fig. 5.

Like the last two species. Entirely of a nitid blackish brown, with some fulvous reflections. Head as in *H. perforatus*, but a little longer. Antennæ of the same form but shorter and velvety. Thorax narrower relatively to the size than that of *H. perforatus* and curved in the same way, not visibly punctate, slightly

eyes approximate. Thorax transverse, the margins very broad and dilated, very minutely rugosely punctate, opaque; the anterior angles crossing in front of the head and rounded at the apex, but much less broadly rounded than in those of *H. Colossus*, the posterior angles not much recurved; the disk is convex, smooth, not perceptibly punctate, and strongly carinate on the median line from a little behind the apex to close to the base, the carina rising in a compressed tubercle at its base; the base of the thorax is bisinuate, the edge near each side minutely serrate. The elytra are very slightly broader than the thorax and nitid, the margins are broad, smooth, impunctate and of a reddish hue with a very thick upturned border, the disk is faintly punctate, with the suture slightly carinate; a very strong carina on each elytron near the suture extending from base to apex, and a line of rather large bead-like tubercles along each side on the marginal junction. Under surface brown, very finely striolate, legs punctate, finely pubescent.

Long. 12 lines, lat. 7 lines.

*Hab.*—South Australia.

#### 71. *HELÆUS MACLEAYI*, Brême.

Mon. Cossyph. I. p. 65, pl. VI. fig. 3.

Entirely of a very nitid brownish-black, smooth. Head somewhat square; clypeus not sensibly emarginate, labrum salient feebly rounded, epicranium convex, forehead very slightly canaliculate between the eyes. Antennæ as long as the thorax, in all respects like that of *H. perforatus*. Thorax finely punctate, less transverse than in the previous species, elongated anteriorly and rounded laterally, subsinuate behind, a very slight emargination on each side a little above the posterior angles, the anterior angles very long, crossing in front of the head and terminating in an obtuse point; the disk a little convex, the median line carinate, more elevated behind; margins broad, wavy, feebly folded on the border. Elytra with a slight irregular puncturation, a little dilated behind the humeral angles, then almost parallel-sided to two-thirds of the length and rounded at the apex, the disk very

convex, nitid, feebly crimped on each side towards the middle of the body and at the margin, a very prominent sutural carina, on each elytron near the suture a short raised carina extending from the base to two-thirds of their length; the margins as broad as that of the prothorax, more narrow behind, irregularly wavy, and folded above on the border. The undersurface is of a very nitid brown and punctate.

Long.  $8\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—King George's Sound.

72. *HELÆUS MASTERSI*, Pascoe.

Ann. Nat. Hist. Ser. 4 Vol. V. p. 99.

"Broadly obovate, dark brown, covered with a loose greyish dust-like squamosity, and furnished above with short erect black bristles, eyes approximate, nearly covered by the prothorax; the latter impunctate, nearly semi-circular, not narrowed at the base, the margin broad, slightly concave, the centre with a narrow very

obtuse, epicranium raised. Antennæ a little longer than the thorax, brown, terminating in a mass formed of the last five joints, the ninth largest, the last oval. Thorax transverse, rounded laterally, narrowed towards the apex and sinuate at the base, entirely rugose and opaque, the disk convex, the median line strongly carinate, the carina more elevated towards the base, near which it terminates in an obtuse point; the margins rather concave and reflexed on the borders, a little convex at the posterior angles which are lightly curved backwards, the anterior angles crossing a little and terminating in a narrow point. Elytra oval, rounded towards the apex, nitid, the disk convex, strongly punctate, suture carinate, on each elytron and nearer the suture than the sides, an elevated thin carina which terminates about one-third of the length from the apex; scutellum rounded, margins smooth, raised at the humeral angles, the rest flat, narrower at the base than that of the thorax and very narrowly reflexed, under surface reddish-brown and rugose, the part embracing the elytra punctate.

Long.  $7\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Swan River, W. Australia.

#### 74. *HELÆUS CONSULARIS*, Pascoe.

Journ. of Ent. II. p. 463.

“Obovate, glabrous, black, shining; prothorax with a toothed carina in the middle, the posterior tooth large, in the form of a compressed triangular spine; scutellum transversely triangular, keeled in the middle; elytra impunctate, the broad strongly reflexed margins faintly punctured, their edges terminated by an erect, narrow border, the raised suture having on each side at a short distance a sharp costa crenated on both sides, and externally near the angle formed by the reflected margin a line of small tubercles which do not however extend to the base; body beneath glabrous, black, shining; legs rugose” (Pascoe).

Length, 11 lines.

*Hab.*—Western Australia.

I have never seen this species.

75. *HELEUS CASTOR*, Pascoe.

Journ. of Ent. II. p. 464.

"Broadly ovate, brownish, scarcely shining, margins of the prothorax and elytra broad and only slightly reflexed, the edges with an erect narrow border; antennæ nearly linear; prothorax with short, scattered bristly hairs, the perforated portion with an elevated margin, disk with a sharp longitudinal line, posterior angles falcate, overlapping the elytra; scutellum broadly triangular; elytra irregularly punctured, and clothed with numerous scattered minute bristles, costa on each side of the suture terminating at about a third from the apex; body beneath dark brown; legs rugose" (Pascoe).

Length, 9 lines.

*Hab.*—South Australia.

. . . . .

77. *HELÆUS HOPEI*, Brême.

Mon. Cossyph. I. p. 68, pl. V. fig. 4.

Oval, dull black ; head rounded and rugose, clypeus not emarginate, separated from the epicranium by a deep transverse groove; labrum rounded and salient. Antennæ scarcely the length of the thorax, rugose and hairy, the four last joints round. Thorax transverse, narrowed in front, convex, sinuate behind, strongly rugose and carinate, the median line elevated into a carina, the margins not reflexed all round, broad particularly towards the posterior angles which are acute and feebly recurved, the anterior angles touch only and are thin and very pointed. The elytra narrow slightly on the sides towards the apex and terminate in a slight point ; they are rugose, with numerous slightly visible costæ, the disk is convex at the base and flattened towards the apex ; on each elytron and about the middle of its breadth is a strongly salient costa, longitudinally rounded, which extends from the base to two-thirds of the length, where it is obliterated and approaches the suture, the suture is not sensibly elevated, the margin is as large as that of the thorax at the humeral angles and is almost reduced to a simple reflected border posteriorly on each side. Legs and under surface dull black.

Long.  $5\frac{1}{2}$  lines, lat.  $3\frac{3}{4}$  lines.

*Hab.*—New Holland, probably West Australia.

I have never seen this species. It differs considerably from all those described above, and seems to lead off to a rather distinct group to which the two following species belong.

78. *HELÆUS SQUAMOSUS*, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol III. p. 286, pl. XII. fig 4.

“ Oblong, parallel at the sides, impunctate, rusty-brown, opaque, sparsely covered with fulvous hairs simulating scales ; head a little prolonged anteriorly ; clypeus rounded ; prothorax rather transverse, with a strongly marked carina in the middle, the foliaceous



margins broad and reflexed; scutellum transversely triangular; elytra moderately convex, depressed along the sutural region, the suture finely raised, and near it on each side a strongly marked carina, which terminates abruptly at a little distance from the apex, a line of small tubercles towards the foliaceous margins, which are moderately broad, but expanded inwardly near the shoulders; body beneath and legs opaque rusty-brown clothed with fine scattered hairs" (Pascoe).

Length, 12 lines.

*Hab.*—Cooper's Creek, Darling River.

79. *HELEUS DERBYENSIS*, n. sp.

Very like *H. squamosus* but larger, and of the same rusty brown, opaque, squamous appearance. The anterior angles of the thorax come in contact but do not cross, the disk is less convex than in *H. squamosus*, and the carina is less and more uniformly

## 4. ELYTRA TUBERCULATE.

This sub-section includes several species so like one another, and so inadequately described, that it becomes a matter of great difficulty to make them out; fortunately I have in my collection the original of *H. echinatus*, a species described by the Rev. Mr. Hope, from an insect sent him by W. S. Macleay, whose MS. name is affixed to the specimen which I now redescribe.

81. *HALÆUS ECHINATUS*, Hope.

Trans. Ent. Soc. Lond. Vol. V. p. 54, pl. VII. fig. 1.

Oval, black, opaque. Head very minutely rugosely punctate, transverse, depressed in front, no visible clypeal suture, clypeus a little emarginate in front, labrum large. Thorax very minutely and roughly striolate punctate, very minutely pubescent, slightly transverse, the margins thickly raised and reflected on the borders, the anterior angles crossing in front of the head and terminating in a narrow rounded point, leaving a transverse opening for the head, the posterior angles very much curved backwards and acute, the disk moderately convex and even, with a low carina on the median line, interrupted in the middle, and a little elevated at the base. Elytra slightly broader than the thorax at the base, not amplified behind, convex, the margins corrugated and slightly reflexed, broad at the shoulders and narrow at the apex; the disk coarsely punctured in twelve close rows, a row of glossy tubercles on the alternate interstices, three of these larger than the others, one rising on each side of the scutellum and running obliquely to the suture at about one-fourth of the length from the base, and thence along the suture, and consisting until near the apex of elongate nearly continuous tubercles, the third and fifth rows of tubercles are larger and more distant, the second, fourth and sixth rows still more distant and slightly smaller. The under surface and legs are opaque and very minutely granulate, the prosternum is very obsoletely carinate; the antennæ are setose, the four last joints broader a little than the others.

Long.  $6\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines. *Hab.*—New South Wales.

82. *HELEUS ECHIDNA*, White.

App. Voy. Grey, p. 464.—Brême, Mon. Coxyph. I. 64, pl. VII. fig. 1.

Of a brilliant black, oblong. Head convex, smooth. Thorax a little sinuate behind, rounded on the sides, slightly convex, smooth with two light depressions on each side behind, the margins broad, raised, wavy and feebly folded on the borders, the anterior angles blunt and crossing, the posterior short but recurved backwards. Elytra oblong, smooth, nitid, rounded towards the apex, the disk convex, with three rows of spines on each elytron, two of them near the suture, the third approaching the margin, the spines of the middle ranges are rather irregularly disposed, and are much stronger than those of the lateral ranges, the margins smooth, as large as those of the thorax, rounded behind, raised and wavy.

Long.  $7\frac{1}{2}$  lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—King George's Sound.

but is continued in a series of a sharp erect spine or tubercles, the suture is spinous and between it and the costa is a line of minute tubercles; there are two other series of tubercles outside the second costa; margins very narrow.

Long.  $7\frac{1}{2}$  lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—New Holland.

84. *HELÆUS TUBERCULATUS*, Brême.

Mon. Cossyph. I. p. 71, pl. VII. fig. 2.

Dull blackish-brown, glabrous, ovate. Antennæ and head as in *H. ovatus*, the latter a little more square and flattened. Thorax smooth, very rounded laterally, transverse and sinuate behind, the disk convex, the median line raised, more strongly posteriorly, the margins broad and rugose, the borders folded above, the anterior angles very acute, touching but not crossing in front, the posterior strongly recurved backwards. Elytra rounded posteriorly and very slightly acuminate at the apex, the humeral angles obtuse, the disk oval, convex, on each side of the suture are two rows of sharp tubercles some of these, particularly near the base, are of elongate form, the row or costa along the suture diverges in front towards the scutellum, of which it takes the direction, the costa of the middle of the elytra forms a narrow line, these costæ are obliterated towards the apex, as well as the tubercles which are irregularly spread over the interstices, the whole surface is coarsely punctate, the margins are smooth and not raised, broad at the humeral angles, narrowing to almost none at the apex.

Long.  $6\frac{1}{2}$  lines, lat.  $4\frac{3}{4}$  lines.

*Hab.*—Victoria.

Genus *SYMPETES*, Pascoe.

Journ. of Ent. II. p. 464.

A genus characterised by Pascoe as being separated from *Helæus* by the anterior angles of the thorax not meeting in front of the head, and from *Saragus* by the mesosternum having no notch for the reception of the prosternal process. Labrum hidden.

85. *SYMPETES MACLEAYI*, Pascoe.

Journ. of Ent. II. p. 465.

"Broadly and almost elliptically ovate, and very much depressed, dark brown, the margins paler, somewhat shining; clypeus broad, emarginate at the apex, and hiding the lip; prothorax finely punctured, the disk at the base scarcely more than a third of the width; scutellum broadly triangular; elytra with rather small punctures, sharply raised along the suture, each elytron with three indistinct lines, the margins nearly flat; body beneath and legs dull reddish-brown, the margins of the prothorax and elytra finely punctured" (Pascoe).

Length, 12 lines.

*Hab.*—King George's Sound, Western Australia.

My specimens of this insect have the median line of the thorax carinated lightly in front, and more elevated towards the base; Mr. Pascoe makes no mention of this, yet as I can scarcely think that there is more than one species of this peculiar flattened form,

little emarginate anteriorly, the clypeus and epicranium convex, separated by a deep suture. Antennæ of a clear brown, about the length of the thorax, the four terminal joints small but more rounded than the others, particularly the last which is oval and pointed. Thorax flat, scarcely visibly punctate, transverse, sinuate behind, rounded on the sides, and narrowed in front, the median line elevated towards the base, the margins flat, broad and bordered, the anterior angles obtuse, half the length of the head, the posterior slightly salient and curved backwards. Elytra rounded behind, convex, nitid, somewhat sinuate at the base, the disk convex and punctate; on each elytron three very obliterate costæ, placed a little obliquely, suture strongly elevated, margins broad, flat and folded on the borders, equally broad throughout and a little gibbous at the humeral angles; under the body brown, punctate; feet of the same colour, the two penultimate segments of the abdomen bordered with red.

Long. 10 lines, lat  $7\frac{1}{4}$  lines.

*Hab.*—West Australia.

#### Genus SARAGUS, Erichs.

Archiv für Naturg. 1842, p. 171.—Lac. Gen. Col. Vol. V, p. 348.

Head sunk in the thorax to the insertion of the antennæ, a little narrowed behind and broadly truncate or sinuate in front, the clypeus separated from the front by a suture frequently almost obsolete. Eyes tolerably prolonged on the front. Antennæ shorter than the thorax; their three, four, or five last joints somewhat orbicular, forming a slightly conspicuous mass. Thorax transverse, parabolically rounded on the sides, broadly and deeply emarginate semi-circularly in front, contiguous to the elytra and bisinuate at the base, with the posterior angles salient behind, the foliaceous part broad, flat or concave, and raised on the borders. Elytra oval, more or less convex, their margins of variable breadth, often narrow throughout. Legs somewhat long; the tibiæ finely rough, the

of New South Wales. A  
ture is to be found included  
fying the formation of new  
myself with dividing the nu  
simplify to the student the i

I divide the genus in the following manner:  
 (1) Insects of the form and sculpture of the elytra have distinctly costate elytra, or coarse reticulate sculpture, or faintly costate, or punctate; this group comprises three distinct types: (a) *S. convexicollis*, Macl.; *S. Hope*. (2) Insects of the form and tricolored elytra, species of this type have tricolored and bluntly produced, and bluntly obtuse; the group will include *S. catenulatus*, Macl.; *S. rugosus*, Boisd. (3) Species of elytra costate as in the last type, punctate. Species—*S. emarginatus*, Hope; *S.*

Those having the elytra striate or faintly costate as—*S. australis*, Boisd.; *S. limbatus*, Pascoe; *S. simplex*, Hope; *S. tarsalis*, Hope; *S. carinatus*, Brême; *S. asidoides*, Pascoe; *S. asperipes*, Pascoe; *S. exulans*, Pascoe; *S. striatipennis*, Maccl.; *S. geminatus*, Maccl. (2) The group of which *S. brunnipes* may be taken as the type. *S. brunnipes*, Brême; *S. Pascoei*, Maccl.; *S. brunnipennis*, Maccl.; *S. magister*, Pascoe, and (3,) of some smooth rather flat circular shaped species chiefly from Western Australia—*S. Duboulayi*, Pascoe; *S. lævis*, Maccl.; *S. gagates*, Brême; *S. orbicularis*, Brême; *S. rotundatus*, Brême; *S. subrugosus*, Brême; *S. unicarinatus*, Brême; *S. patelliformis*, Pascoe. Other species remain which can scarcely be placed with any of the foregoing groups. *S. ovalis*, Maccl., a smooth oblong species of the *S. incisus* type, and *Helæus testudineus*, Hope, which may be a *Saragus*, but has a general resemblance to the genus *Encara*.

## SECTION I.

## ELYTRA COSTATE.

## 88. SARAGUS INCISUS, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. V. p. 101.

“Obovate, dark-brown, opaque; head and prothorax covered with short minute ridges (except the centre of the latter), and more or less longitudinal or slightly oblique; eyes not approximate, front rather concave; prothorax deeply emarginate at the apex, the angles on each side produced, subacute, behind the middle a slightly gibbous lobe angularly emarginate posteriorly; scutellum broad, rounded behind; elytra gradually broader behind for about two-thirds of their length, the suture finely raised, each elytron with a stout costa near the suture, abruptly terminating near the commencement of the posterior declivity, the space between the two irregularly but finely punctured, between the costa and the expanded margin three rows of small elevated tubercles; body beneath and legs black, rather glossy” (Pascoe).

Length, 10 lines.

*Hab.*—Mudgee, New South Wales.



In my specimens of this insect, the head and thorax are more minutely and densely granulate, and the gibbous elevation on the thorax is large and bi-tuberculate.

89. *SARAGUS CONVEXICOLLIS*, n. sp.

In form and sculpture very like the preceding species. It differs in being of more elongate form, and of a more nitid black colour. The thorax is less thickly granular and less transverse, the disk very convex with a well marked median line, and the anterior angles less pointed. The elytra are more parallel sided, the costa on each side of the suture is continuous almost to the apex, the tubercles on the three outer rows smaller and the interstices more granular than in *S. incisus*, the space between the two costae punctate.

Long. 10 lines, lat. 5 lines.

π' σ' ι' α' ρ' υ'

## 91. SARAGUS SPINOLÆ, Hope.

*Helæus Spinolæ*, Hope, Trans. Ent. Soc. Lond. Vol. V. 1848, p. 53, pl. VI. fig. 3.

Black, the thorax and margins of the elytra blackish-brown, legs piceous. Ovate, head depressed, subrugose, the anterior angles of the thorax not meeting, the elytra furnished in the middle with long, crisp, black hair. Body beneath piceous, of the same colour as the legs. Long.  $9\frac{1}{2}$  lines, lat.  $6\frac{1}{2}$  lines.

*Hab.*—Swan River.

To this description of Hope's, Westwood has added in a note with reference to its affinity to *H. perforatus*, Kirby—"It is of a much more regularly oval form, with each extremity somewhat acute, the anterior angles of the prothorax are subtruncate in front of the eyes, and do not overlap each other, leaving an open space of nearly the breadth of the head. The disk of the prothorax has two impressed spots, and wants the central posterior tubercle which exists in *H. perforatus*."

I have never seen this insect, but from the plate and description I have no hesitation in placing it in this genus, and in the *incisus* group, the lines of crisp hair taking the place of the costæ.

## 92. SARAGUS LAEVICOLLIS, Fabr.

*Silpha laevicollis*, Fabr. Ent. Syst. 1, 250, 8.—Syst. El. 1, p. 338, 8.—Ol. Ins. 2, 11, 12, tab. II. fig. 15; *Cilibe laevicollis*, De Brême, Mon. des Cossyph. I. p. 44, pl. III. fig. 1.; *Saragus laevicollis* Erichs. Wieg. Archiv 1842, I. p. 172, pl. 4, f. 7; Hope, Trans. Ent. Soc. Lond. Vol. V. 1848, p. 56, pl. VII. fig. 5.

Oval, black, opaque; head rounded, salient, convex and rugose, border of the epistome and epicranium a little raised. Antennae short, of a reddish brown; the last five joints broader and rounder than the others. Thorax transverse, sinuate posteriorly and rounded on the sides; the disk convex and rugose,

the margins broad and transversely wrinkled, anterior angles rounded, not much advanced, the posterior slightly recurved. Elytra very convex, oval, punctate, a little dilated towards the middle, the humeral angles obtuse; on each elytron three sharp costæ, rising from the base and not reaching the apex; these costæ are irregularly interrupted behind, the interstices have each a row of distant tubercles of unequal size, the margins are narrow. The under surface is of a subnitid brown and punctate.

Long. 7 lines, lat. 5 lines.

*Hab.*—Tasmania, Victoria, and South Australia.

This and some of the following species seem to differ much from the rest of the genus in having a very strong blunt tooth rising from the outer apex of the anterior tibiæ.

93. *SARAGUS ODEWAHNII*, Pascoe.

Journ. of Ent. II. p. 467.

"Shortly ovate, blackish-brown opaque; elytra slightly con-

minutely granular, and not corrugated on the margins, in having the costæ of the elytra very narrow and rather wavy, in having a row of small distant elongate tubercles in the interstices which are obsoletely rugose and minutely granulate.

Long. 7 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Murrumbidgee.

95. *SARAGUS RUDIS*, n. sp.

Broader and flatter than the last, black, opaque, the margins reddish. Head minutely granulate, rather depressed, emarginate. Thorax minutely granular, transversely convex near the base, the margins broad and corrugate. Elytra strongly tricostate, the costæ somewhat crenulate and continuous almost to the apex, the interstices coarsely and rugosely punctate and granulate, the margins broad and corrugate. Under surface nitid, the spur on the fore tibiæ more long and acute than in the preceding species.

Long. 8 lines, lat. 5 lines.

*Hab.*—Monaro, Mudgee.

96. *SARAGUS LEVICOSTATUS*, n. sp.

Very opaque and convex, much smaller than *S. lævicollis*, from which it differs chiefly in the sculpture of the elytra, in which the costæ are very fine, and composed of single rows of more or less distant minute tubercles, the alternate rows most distant, the margins are narrow; the tibiæ much serrated on the outside, the anterior tibiæ most so, and the terminal spur very large.

Long.  $4\frac{1}{4}$  lines, lat. 3 lines.

*Hab.*—South Australia.

97. *SARAGUS RUGOSUS*, Boisd.

*Cilibe rugosa*, Boisd. Voy. de l'Astrol. Ent. p. 264.

Black, the thorax very finely rugose, elytra bicostate in front, with series of oblong rough, elevated points.

*Hab.*—New Holland.

This is all the description given by Boisduval. It seems to be of the *S. lævicollis* type.

emarginate in front, the corners  
testaceous, the terminal joint the  
feebly granulate, narrow in  
margin broad, flat; anterior an  
length of the head, the posterior  
sinuate at the base, oval, a littl  
nating in a very obtuse poin  
impressed points, and have eac  
the exterior is least marked, th  
margins narrow, raised on th  
black, slightly punctate.

Long. 7 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Victoria.

#### 99. SARAGUS IN

*Cilibe interruptus*, Brême, M

Of a blackish-brown colour.  
salient, a little emarginate in fr  
Thorax transverse, convex, rou  
on the posterior border, gra  
borders a little folded above  
reaching half the length of the  
and recurved backwards. Ely  
and a little pointed at the apex

## 100. SARAGUS MARGINELLUS, Hope.

*Helæus marginellus*, Hope, Trans. Ent. Soc. Lond. Vol. V. 1848, p. 55, pl. VII. fig. 4.

"Ater, antennis concoloribus; thorace convexo, creberrime sub-tuberculato, marginibusque lateralibus rubro-piceis. Elytra ternis lineis majoribus rugoso-elevatis conspicua, granulisque crebris in interstitiis satis apparentibus, margineque externo elytrorum rubro-piceo. Corpus infra nigrum, pedibus piceis" (Hope),  
Long. 8 lines, lat. 5 lines.

*Hab.*—Norfolk Sound.

## 101. SARAGUS CONFIRMATUS, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. V. p. 102.

"Rather broadly obovate, black, slightly opaque; head finely punctured, broad in front, the clypeus not emarginate; prothorax very minutely punctured, the disk slightly convex, distinctly separated from the margins, which are unicolorous and not thickened at the edges; scutellum broadly transverse; elytra more convex posteriorly, impunctate, but closely covered with minute granules, each with four elevated lines gradually disappearing posteriorly, the first and third strongly marked, the fourth nearly obsolete, the suture raised, the margins not dilated, except very slightly at the anterior angles, and forming a narrow elevated edge; body beneath and femora brownish-black, finely punctured; tibiæ minutely spinulous; tarsi slightly ferruginous; antennæ blackish, the last joint nearly circular, ferruginous" (Pascoe).

Length, 6 lines.

*Hab.*—West Australia.

## 102. SARAGUS OPACIPENNIS, n. sp.

Broadly ovate, black, sub-opaque. Head very minutely punctate, the lateral angles round and salient. Thorax sub-nitid, very minutely punctate, the disk a little convex, with the median line lightly marked and almost imperceptibly and broadly depressed near the base, and the margins broad and nearly flat, the anterior

angles are advanced and the posterior recurved. The scutellum is transversely triangular and smooth. The elytra are rather convex, with the suture and four lines on the disk costate, these costæ are raised and smooth, the sutural one continuous to the apex, the others for two-thirds of the length, the first from the suture the largest, the interstices are broad, flat, opaque and very obsolete punctate; the margins are moderately broad. The under surface is striolate, punctate and sub-nitid.

Long. 6 lines, lat. 4 lines.

*Hab.*—Derby, North West Australia.

103. *SARAGUS INFELIX*, Pascoe.

Journ. Ent. Vol. II. p. 466.

"Shortly ovate, blackish brown, opaque; clypeus very transverse, narrower anteriorly and emarginate, separated from the head by a deep semi-circular line; head finely but rugosely punctured; prothorax closely covered with small oblong punctures, the margins broad and sub-granulous, the apex rather broadly

antescutellum impresso, sat dense aciculato-punctato, punctis pilum minutissimum brunneum gerentibus; elytris thorace non latioribus, lateribus parallelis, postice fortiter declivibus; humeris oblique truncatis, angulo fere spinoso; supra costis tribus undulatis, interstitiis subtilissime granulatis; granulis pilum ut in thorace gerentibus; processu prosternali valde producto, acuminato, grosse punctato" (Haag-Rut).

Long. 12-17 mm., lat.  $7\frac{1}{2}$ -10 mm.

*Hab.*—Queensland, Peak Downs.

105 SARAGUS RETICULATUS, Haag-Rut.

Journ. Mus. Godef. Heft 14, p. 116, Note.

"Ovalis, niger, opacus; capite thoraceque ut in *lurido*; elytris latitudine vix longioribus, lateribus explanatis, supra minus convexis, carinis tribus parum elevatis undulatis, rugulis transversis inter se connexis; interstitiis indistincte rugolosis, punctatis" (Haag-Rut).

Long. 13 mm., lat. 9 mm.

*Hab.*—Endeavour River.

106. SARAGUS CLATHRATUS, n. sp.

Of the form and size of *S. luridus*. Head and thorax similarly but more thinly punctate in the middle than in that species. Elytra with three strong tortuous costæ on each, with occasional incomplete transverse connections, the interstices very rugose and coarsely and thinly punctured. In all else like *S. luridus*.

Long. 6 lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—Fitzroy Downs.

107. SARAGUS CRENULATUS, n. sp.

Like the preceding three species. The thorax more densely and minutely vermiculate-punctate; the costæ on the elytra thinner than in the last species and less tortuous, the interstices with several very irregular rows of very minute granules; the costæ are nitid, the interstices densely covered with a greyish indument.

Long. 5-6 lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—Port Denison.



broad, and raised and thickly fold moderately convex, and slightly suture costate, three irregular cost connected with very irregular tr with large rugose punctures, the shoulders and smooth, behind narrow black, nitid, striolate.

Long. 6 lines, lat  $3\frac{1}{4}$  lines.

*Hab.*—Monaro, New South Wa

## SECTION

### ELYTRA LINEATE-PUNCTATE, (

#### 109. SARAGUS AC

*Cilibe australis*, Boisd. Voy. de Cosayph. p. 43, pl. IV. fig. 2.

Of a blackish brown colour, gl and salient, finely punctate, a litt salient, forehead concave. Thorax rounded on the sides and strongly broad, scarcely elevated, with round more than half the length of the and recurved. Elytra convex, a li

The sculpturation of the elytra is so smooth, that I place this species, perhaps incorrectly, in this section.

110. SARAGUS LIMBATUS, Pascoe.

Ann. Nat. Hist. Ser. 4, Vol. III. p. 287.

"Broadly oval, moderately convex, brownish-black, scarcely nitid; head and prothorax finely punctured, the latter slightly convex, the basal foveæ nearly obsolete, the anterior angles rounded, posterior produced and recurved, foliaceous margins moderately broad, a little reflexed, and edged with a thickened border; scutellum transversely triangular. Elytra not broader than the prothorax, finely seriate-punctate, the intermediate spaces between the rows raised, three or four on each side the suture the most so, those towards the sides gradually disappearing, foliaceous margins narrowing gradually posteriorly, transversely corrugated; body beneath and legs dark chestnut-brown, a little glossy, the abdominal segments longitudinally corrugated; antennæ ferruginous brown" (Pascoe).

Length, 7 lines.

*Hab.*—Melbourne, Gawler.

111. SARAGUS SIMPLEX, Hope.

*Helæus simplex*, Hope, Trans. Ent. Soc. Vol. V. p. 55, pl. VII. fig. 2.

"Silphaeiformis, ater, capite subdepresso. Thorax convexus, marginibus elevatis. Elytra lineis elevatis haud valde conspicuis; per totum discum puncta sub-lente confertissime apparent. Corpus infra nigrum, nitidum, femoribus tibiisque concoloribus tarsisque flavo-spongiosis" (Hope).

Long. 9 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—West and South Australia.

112. *SARAGUS TARSALIS*, Hope.

*Helæus tarsalis*, Hope, Trans. Ent. Soc. Vol. V. p. 55, pl. VII fig. 3.

"Phosphugaeformis, ater, antennis sub-pilosis et piceis. Thorax convexus, lateribus externis margine elevato conspicuis. Elytra nigra, lineis elevatis notata, interstitiis valde punctulatis. Corpus infra nigrum tarsis pedum flavo-spongiosis" (Hope).

Long. 6 lines, lat  $3\frac{3}{4}$  lines.

*Hab.*—Swan River.

113. *SARAGUS CARINATUS*, Brême.

*Cilibe carinatus*, Brême, Mon. Cossyph. I. p. 41, pl. III. fig. 2.

Brown, ovate, glabrous. Head punctate, strongly cut in and narrowed at the anterior angles, labrum salient, narrow, clypeus convex, anterior angles of the epicranium rounded, salient and a little elevated, forehead convex. Thorax finely punctate, trans-

side, shining ; elytra flattish at the base, more convex posteriorly, with small punctures in slightly irregular lines, the margins very distinct at the shoulders, but gradually narrowing to the apex, where they nearly disappear ; body beneath and legs black, slightly nitid ; the latter and antennæ with a thin ferruginous pubescence" (Pascoe.)

Length, 7 lines.

*Hab.*—South Australia.

Mr. Pascoe seems to have fancied that this species might be identical with *S. simplex*, Hope ; it is however a much smoother insect, and more resembles *S. carinatus*, Brême.

#### 115. SARAGUS ASPERIPES, Pascoe.

Trans. Ent. Soc. London, Ser. 4, Vol. V. p. 101.

"Rather shortly obovate, brownish-black, opaque ; clypeus slightly emarginate ; head and prothorax finely but not closely punctured, the latter with the disk slightly convex, distinctly separated from the margins, and of a paler brown, raised and thickened at the edges ; scutellum broadly transverse ; elytra more convex posteriorly, finely punctured in slightly irregular lines, every fourth interval between the lines slightly elevated ; the margins very narrow and gradually obliterated posteriorly, not marked with transverse folds ; body beneath and legs brown, slightly nitid ; tibiæ covered with small hispid tubercles ; tarsi yellowish-ferruginous ; antennæ with the last joint nearly circular" (Pascoe).

Length, 5-6 lines.

*Hab.*—Port Lincoln, South Australia.

#### 116. SARAGUS EXULANS, Pascoe.

Journ. of Ent. Vol. II. p. 466.

"Oblong-ovate, convex, dark reddish brown, sub-nitid ; clypeus sloping at the sides, the apex emarginate ; head finely but rugosely punctured ; prothorax closely and finely punctured ; the punctures

here and there confluent, the apex broadly emarginate, the lateral margins nearly confounded with the disk; elytra closely lineate-punctate, the margins very narrow, and almost disappearing posteriorly; body beneath and femora glossy chestnut-brown; tibiae, tarsi, and antennae pale ferruginous, finely pubescent" (Pascoe).

Length,  $5\frac{1}{2}$  lines.

*Hab.*—Lord Howe's Island.

117. *SARAGUS STRIATIPENNIS*, n. sp.

Ovate, black, sub-nitid. Head almost smooth, clypeus very slightly emarginate. Thorax smooth, convex on the disk, deeply emarginate in front, sinuate behind, with the margins broad and turned up and thickened on the edge. Elytra slightly convex, and scarcely rounded on the side, covered with close rows of coarse irregular rather shallow punctures, the interstices 4-8-12 slightly costate, and 2-6 and 10 just traceable, the margins are rather broad and corrugated; under surface black, nitid and punctate; the terminal spur of the fore tibiae short and conical, the second and

## 119. SARAGUS BRUNNIPES, Brême.

*Cilibe brunneipes*, Boisd.—Brême, Mon. Cossyph. I. p. 37, pl. III. fig. 4.

Brown, nitid, ovate, glabrous. Head transversal, strongly punctate, labrum salient, clypeus convex and a little emarginate in front, epicranium convex, maxillary palpi testaceous; antennæ short, the last joint terminating in a point. Thorax transverse, rounded laterally, finely punctate, sinuate behind, the disk convex, nitid, the margins light brown, flat, slightly bordered at the anterior angles which are half the length of the head, the posterior slightly pointed backwards. Elytra very convex, nitid, with many series of minute punctures, the interstices very feebly raised, the margins narrow, almost none at the apex. Body beneath reddish-brown, nitid, the terminal spur of the anterior tibiæ very large.

Long.  $5\frac{1}{2}$  lines, lat.  $3\frac{1}{2}$  lines.

*Hab.*—Swan River.

## 120. SARAGUS PASCOEI, n. sp.

Brownish or piceous black, nitid, round, very convex. Head small, thinly and minutely punctate; the clypeus with reflexed border. Thorax more than three times wider than long, entirely smooth, the anterior angles much rounded and reaching the middle of the head, the posterior angles rounded, the base little sinuate, the margins broad, smooth and nearly flat. Elytra perfectly smooth, with numerous irregular rows of minute punctures; the margins smooth, broad at the shoulders, narrow towards the apex. Beneath very nitid; terminal spur of the anterior tibiæ very strong and acute, the tarsi densely clothed with golden pubescence.

Long.  $8\frac{1}{2}$  lines, lat. 7 lines.

*Hab.*—Port Augusta, South Australia.

121. *SARAGUS BRUNNIPENNIS*, n. sp.

Ovate, piceous, nitid, moderately convex. Head finely punctate, clypeus a little emarginate. Thorax transverse, deeply emarginate in front, lightly sinuate behind, the disk very minutely punctate, the margins rather broad and rugosely punctate. Elytra with numerous close rows of well-marked rather irregular punctures, the interstices not raised, the margins smooth, narrow and reflexed on the borders. Beneath very nitid.

Long.  $4\frac{1}{2}$  lines, lat  $2\frac{1}{2}$  lines.

*Hab.*—King George's Sound.

122. *SARAGUS MAGISTER*, Pascoe.

Journ. of Ent. Vol. II. p. 465.

"Elliptic-ovate, black and shining, very smooth and impunctate, clypeus transverse, gradually rounded from the antennary orbits, prothorax rather narrowly emarginate at the apex the disk

than half the breadth at the base, and separated from the margins by a strongly marked curved impression ; elytra with numerous small punctures, the disk slightly concave, the margin very distinct, gradually narrowing posteriorly ; body beneath like the upper part ; legs and antennæ pale reddish-brown, with a short greyish pile " (Pascoe).

Length, 5 lines.

*Hab.*—Champion Bay.

124. *SARAGUS LÆVIS*, n. sp.

Broadly ovate, sub-depressed, black, sub-nitid, very smooth. Head broadly rounded and very slightly reflected in front, punctation if any extremely minute. Thorax smooth, the disk a little convex, the emargination in front deep and narrow, the posterior angles acutely recurved. Elytra not visibly punctate, slightly convex, the margins as broad at the humeral angles as those of the thorax, flat and thickened on the edge, the humeral angles broadly rounded. The terminal spur of the anterior tibiæ acute but not large, the tarsi are clothed beneath with golden hair, the three first joints enlarged.

Long. 8 lines, lat. 5 lines.

*Hab.*—Interior New South Wales.

125. *SARAGUS GAGATES*, Brême.

*Cilibe gagates*, Brême, Mon. Cossyph. I. p. 52, pl. IV. fig. 1.

Ovate, deep black, nitid. Head transverse, a little emarginate in front, and raised on the borders ; clypeus transversely wrinkled ; epicranium convex ; antennæ short, the terminal joints slightly dilated and testaceous. Thorax smooth, transverse, narrowed in front, nitid, the median line elevated into a carina, margins broad, scarcely granulose, flat, the edge folded upwards, the anterior angles extending beyond the half of the head, the posterior a little recurved. Elytra somewhat sinuate at the base, convex,



*Cilibe orbicularis*, Brême, Mc  
Brownish-black, round. Head  
as long, punctate and feebly  
emarginate; epicranium separa  
ridge, antennæ as in *S. rotunda*  
sinuate behind, feebly rugose c  
tudinally carinated, disk broad,  
edge, anterior angles obtuse, re  
posterior angles salient. Elytr  
little dilated behind, and termin  
angles obtuse, the margins rather  
upper edge.

Long.  $9\frac{1}{2}$  lines, lat. 8 lines.

*Hab.*—West Australia (?).

127. SARAGUS PA

Ann. Nat. Hist. Ser. 4, Vol.

"Nearly round, depressed,  
and nearly glabrous; head sm  
of the punctures granuliform;  
narrow, with a well-marked ce  
margins as broad as the disk;  
gular; elytra rather finely but  
ribbed the sutures raised into a

## 128. SARAGUS ROTUNDATUS, Brême.

*Cilibe rotundatus*, Brême, Mon. Cossyph. I. p. 50, pl. IV. fig. 4.

Obscure-brown, glabrous, sub-nitid, round. Head sub-punctate, angles of the clypeus dilated on each side, the epicranium raised and separated from the clypeus by a somewhat circular raised suture, the forehead hollowed between the eyes; antennæ short, brown, the eighth and ninth joints round but not larger than the others, the eleventh slender and oval. Thorax strongly transverse, sub-punctate, rounded in front, slightly sinuate behind, disk depressed with two fossettes on each side of the median line, which form towards the base a very small raised spine; margins very broad, flat, strongly raised and folded on the border; the anterior angles reaching the extremity of the head, the posterior prolonged and recurved. Elytra sinuate at the base, convex, finely punctate, suture carinate, margins very dilated, flat, a little swollen at the humeral angles, all of the same width, beneath brown, punctate and nitid.

Long. 8 lines, lat. 7 lines.

*Hab.*—Swan River.

The following species do not answer exactly to any of the preceding sections.

## 129. SARAGUS SUBRUGOSUS, Brême.

*Cilibe subrugosus*, Brême, Mon. Cossyph. I. p. 49, pl. IV. fig. 5.

Brown, broadly ovate, very rugose; head rather square, rounded in front, scarcely punctate, antennæ short, brown, the basal joints thickened; thorax rounded laterally, narrowed in front, transverse, sinuate behind and rugose, depressed above on each side of the median line, which is slightly raised, margins broad, flat, the anterior angles attaining two-thirds the length of the head, very acute and salient, the posterior ones recurved. Elytra rugose, very convex, rounded laterally, pointed behind, with numerous lines slightly visible, the suture carinate, margins broad, a little swollen at the humeral angles.

Long.  $6\frac{3}{4}$  lines, lat. 5 lines,

*Hab.*—Western Australia (?).

130. *SARAGUS UNICARINATUS*, Boisd.

*Cilibe unicarinatus*, Boisd. Voy. Astrol. p. 265.—Brême, Mon. Cossyph. I. p. 48, pl. IV. fig. 6.

Ovate, brown, glabrous, head rounded in front, feebly emarginate and punctate, epicranium concave. Thorax flat, transverse, lightly carinate, finely granulate, rounded on the sides and narrowed in front, margins broad, flat, anterior angles salient and sharp, reaching beyond the middle of the head, the posterior angles recurved. Elytra slightly dilated in the middle; pointed at the apex, very convex, punctate with numerous scarcely visible raised lines, suture strongly carinate, margins flat, broad at the base, narrower behind; beneath brown, nitid and strongly punctate.

Long. 6 lines, lat.  $4\frac{1}{2}$  lines.

*Hab.*—Kangaroo Island.

132. *SARAGUS TESTUDINEUS*, Hope.

*Helæus testudineus*, Hope, Trans. Ent. Soc. Lond. Vol. V. p 53, pl. VI. fig. 4.

“Lato-ovalis, cænicolor, squalidus, capite depresso, angulis anticis thoracis haud complicatis. Elytra sutura elevata, medio discicrebris elevatis lineis satis notato, margine omni lato elytrorum undulato. Corpus infra concolor” (Hope).

Long.  $8\frac{3}{4}$  lines, lat.  $7\frac{3}{4}$  lines.

*Hab.*—Port Essington.

This is certainly not a *Helæus*, and I rather doubt its right to be placed in *Saragus*.

The only other recorded species of this genus I know of, is *Saragus marginatus*, Sol., (Studi Ent., p. 356) and of that I have never seen any description.

PHILEMON

The species at present called Mr. Thomas Boyer-Batavia, and is mentioned in our Proceedings for 188

*Male*.—The whole of darker on the wings and webs of the quills with a tail feathers and the first throat is of an ashy tint; with yellow, sides of the face the skin being bluish-black white collar round the neck behind the ear-coverts, and a coverts across the throat; forms a distinct patch on the of immaturity are shown region being margined with wing, 5·1 inches; tail, 4·6 inches.

DESCRIPTION OF A NEW SPECIES OF *GERYGONE*  
FROM LORD HOWE'S ISLAND.

BY DR. E. P. RAMSAY, F.R.S.E., &c.

*GERYGONE THORPEI*, *sp. nov.*

The present species, which I have dedicated to Mr. J. A. Thorpe its discoverer and one of our most skilled taxidermists, was obtained during a recent trip to Lord Howe's Island. A previous species (*G. insularis*) is described in the Proceedings of the Linnean Society of N. S. Wales, Vol. III. p. 117, to which the present is allied, but differs in having the whole of the under surface citron-yellow.

*Adult Male*.—The whole of the upper surface uniform dull-brown with a decided tinge of olive, the margins of the outer webs of the wing-feathers ashy, the whole of the under surface, a narrow indistinct ring round the eye, and the under tail-coverts citron-yellow, tail brown with a blackish sub-terminal band, and a sub-terminal spot of white near the tip, which extends on to both webs on the outermost tail feathers, but is confined to the inner webs on the others, being lost on the central two tail feathers, the outer feather on either side is moreover narrowly margined with white, more distinctly on the outer web near the base, the others similarly marked but less distinctly. Total length, 4·1 inches; wing, 2 inches; tail, 2 inches; tarsus, 0·85 inch; bill, 0·55 inch.

*Hab.*—Lord Howe's Island.

ONYCHOPRION 1

Eggs of a dull white, varying finely dotted, others strongly reddish-brown or brownish-red or thickly and closely marked evenly all over the surface, in larger end where they are marked which are confluent with blackish smears and blotches; in others blotches and confluent thicker end, or the whole surface with reddish-brown and pale al

*Hab.*—Admiralty Islets.

Length (a),  $2.1 \times 1.42$  inches.  
 " (b),  $2.01 \times 1.43$  "  
 " (c),  $1.95 \times 1.42$  "  
 " (d),  $2.01 \times 1.42$  "

ANOUS SIX

Ground color of the egg d

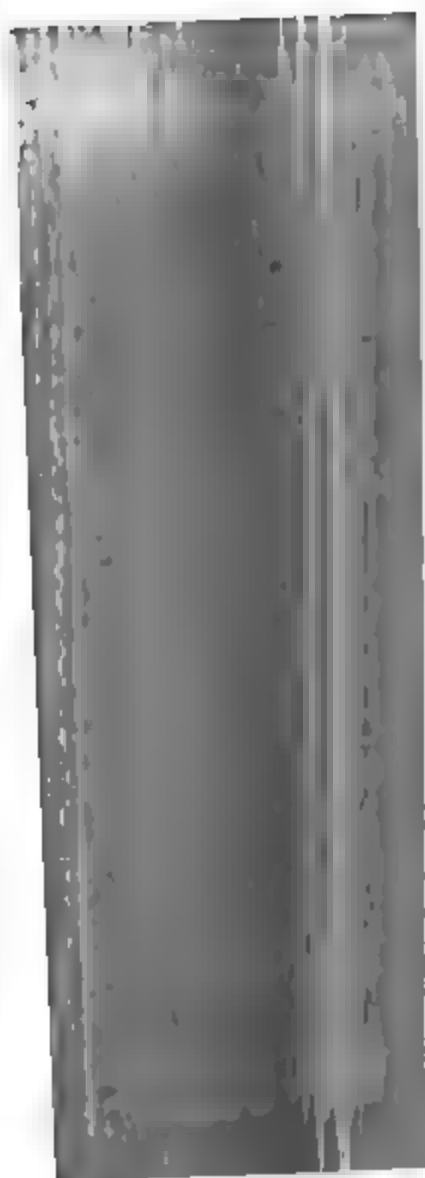
SULA CYANOPS, *Sundevall.*

Eggs of a light bluish white or dull white, stained with blackish or reddish-brown smears, hair-lines and spots; when first laid apparently milk-white, shell rough, very limy, inner shell beneath the limy surface bluish white. Length, (a) 2.65 inches  $\times$  1.8 inches; (b) 2.58 inches  $\times$  1.8 inches, (c) 2.6 inches  $\times$  1.9 inches; (d) 1.56 inches  $\times$  1.83 inches.

Found on the Admiralty Islets.

The specimens here described were obtained by Mr. Etheridge and two of the employés of the Australian Museum, Messrs. Thorpe and Whitelegge, during a recent excursion to Lord Howe's Island whilst investigating the zoology of that interesting region. Details of their explorations will be found in future reports on the excursion.





species of Polyzoa from  
Mag. Nat. Hist., Sept.  
that the shape of the ori  
of *Porina*, and, in fact, o  
a large number of spe  
that the aperture does  
is the aperture which i  
show. On viewing a sq  
culum may be seen in  
open, and in every case  
at all, is situated betw  
culum ; the latter is hing  
and, when fully open, the  
of the next cell above, w  
that the free edge of the  
straight edge is attached  
reversed aperture evidentl  
he penned his description  
from the usual structure  
opportunity of calling the  
fact. In conclusion, I m  
common in Port Jackson.

Mr. Ogilby exhibited the type-specimen of the fish described in the paper by Dr. Ramsay and himself.

Mr. Prince shewed a collection of Wood-moths, including fine examples of *Zelotypia Stacyi*, Scott, of two species of *Pielus*, and of two of *Charagia*.

Mr. Maiden exhibited specimens of over one hundred species of Plants collected by Mr. W. Bäuerlen in the Wilcannia district, and said that the collection would be left at the Hall for a week for the convenience of any members who may wish to examine it.

**Mr. James Doherty, Dubbo,**

**The President announced  
mation of the death of Sper  
of the Smithsonian Institut  
Museum, and an Honorary  
received during the month.**

**The President also annou  
arranged for Saturday, Dec  
Station by the 8-15 a.m. tr  
Line.**

**"Transactions and Procee  
Vol. XXIV., Part 1 (1887)**

"Zoologischer Anzeiger." X. Jahrg., Nos. 261, 262 (1887).  
*From the Editor.*

"Feuille des Jeunes Naturalistes." No. 204 (October, 1887).  
*From the Editor.*

"Proceedings of the Zoological Society of London for the year 1887." Part II. *From the Society.*

"Bulletins de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique." 3me Série, Tomes IX.-XIII., (1885-87); "Annuaire," 1886 and 1887. *From the Academy.*

"Comptes Rendus des Séances de l'Académie des Sciences, Paris." Tome CV., Nos. 8-13 (1887). *From the Academy.*

"Iconography of Australian Species of *Acacia* and Cognate Genera." By Baron Ferd. von Mueller, K.C.M.G., M. and Ph.D., F.R.S., Government Botanist of the Colony of Victoria. Decades I-IV. *From the Government of Victoria.*

"The Victorian Naturalist." Vol. IV., No. 7 (November, 1887). *From the Field Naturalists' Club of Victoria.*

"Bulletin de la Société Belge de Microscopie." 13me Année, No. X. (1887). *From the Society.*

"The Scottish Geographical Magazine." Vol. III., No. 10 (October, 1887); "State of New York—Second Report of the Oyster Investigation and of Survey of Oyster Territory, for the years 1885 and 1886." By Eugene G. Blackford, Commissioner of Fisheries. *From the Hon. W. Mackay, P.L.S.*

"The Journal of Comparative Medicine and Surgery." Vol. VIII., No. 4 (1887). *From the Editor.*

"The American Naturalist." Vol. XXI., Nos. 1-3 (January—September, 1887). *From the Editors.*

"The Canadian Record of Science." Vol. II., No. 3 (1887).  
*From the Natural History Society of Montreal.*

"Bryozoa from New South  
Parts I.-III.; "On Tertiary  
Zealand." By A. W. Waters

"Journal of the College  
Japan." Vol. I., Part 4 (188

"Australasian Journal of 1  
1887). *From the Editor.*

PAPERS READ.

ON THE VOLCANO OF TAAL.

BY THE REV. J. E. TENISON-WOODS, F.G.S., F.L.S., &c.

(Plates XVIII and XIX.)

During my travels in the Philippine Islands I paid a visit to the active volcano of Taal, which, on account of its peculiarities, its situation and its long-continued activity, is certainly one of the most remarkable volcanoes of the world. It is situated amongst the Philippines, in the Island of Luzon, at no great distance from Manila, between N. lat.  $13^{\circ} 52'$ , and  $14^{\circ} 7'$ , and long. about  $121^{\circ}$  E. It is in the north-west portion of the province of Batangas, and almost due south of Manila. The bay of Manila which makes a deep indentation on the south end of Luzon, is succeeded after a short interval of coast line by the Seno de Balayan, a small bay, and separated from this by a narrow ridge of ash and coral sand, is a lake in the centre of which is the active crater of Bombon or Taal.

I propose in the following paper to give a statistical, geological and botanical account of this volcanic district, together with such particulars of its history as I have been able to collect from Spanish sources.

LITERATURE.—The historical records of the Philippine Islands are very abundant. Most of the Missionary Orders have published annals of their religious enterprises, and have kept occasional chronicles of anything remarkable which occurred in their respective missions. All these have been printed under their own auspices, and now form a voluminous library, in which it is easy to trace any event of importance since the Spaniards came into possession of the Philippine Islands. I believe there are no colonial possessions in the world in which the literature connected with the country is so extensive.

"Estudio Geológico de  
Inspector general de Minas

"Relación de lo sucedido  
escrita en Bauán en 22 de  
cisco Bencuchillo."

"Boletín de la Carta G.  
quoted (Vol. VIII.), the v  
published at Vienna, which  
It is entitled, "Data for  
Luzon."

"Reise der österreichisch

"Tierras y Razas del Ar  
y Sanchez." Manila 1886

"Phanerogamæ Cuming

"Viajes por Filipinas de  
S. Vidal y Soler." Madrid

"El Mayon, ó Volcán  
Abella y Casariego. Mad

"El Monte Maquilin (L  
canicas" por Don Enrique

"Memoria sobre los Ter  
1880 en la Isla de Luzón " ]

“Murillo Velardo (P. Pedro) Historia de la provincia de Philipinas de la compañía de Jesus, que comprehende las progressos de esta provincia desde 1616, hasta 1716.”

“Zuñiga (Martinez de) Historia de las islas de Philipinas compuesta por el R. P. lector Fr. Joaquin Martinez de Zuñiga En Sampaloc por Fr. Pedro Argüeles, 1803 in 4 de 4 ff. prélim. et 687 pp.”

“Zuñiga (Martinez de). An Historical View of the Philippine Islands: from the Spanish (published at Manila 1803), 2 vols. 8vo., Lond. 1814.”

“Novissima Appendix ad Floram Philippinarum. R. P. Emmanuelis Blanco, Auct. P.P. F.F., Naves et Villar. Augustinianis.” Manila 1880.

“Sinopsis de familias y generos de plantas leñosas de Filipinas, Introduccion á la flora forestal del Archipiélago Filipino, redactada por Don Sebastian Vidal y Soler.” Manila 1883.

“Reisen im Archipel der Philippinen von Dr. C. Semper.” Wiesbaden 1877.

“Guia Oficial de Filipinas 1885.” Manila 1884-5-6.

“A Descriptive Dictionary of the Indian Islands and adjacent countries.” By John Crawfurd, F.R.S., London, 1856.

“Plantkundig, Woordenboek voor Nederlandsch-Indië.” G. J. Filet, Leiden, 1876.

“Planten van Nederlandsch-Indië, Bruikbaar voor Handel, Nijverheid en Geneeskunde, door A. H. Bisschop Grevelink.” Amsterdam 1883.

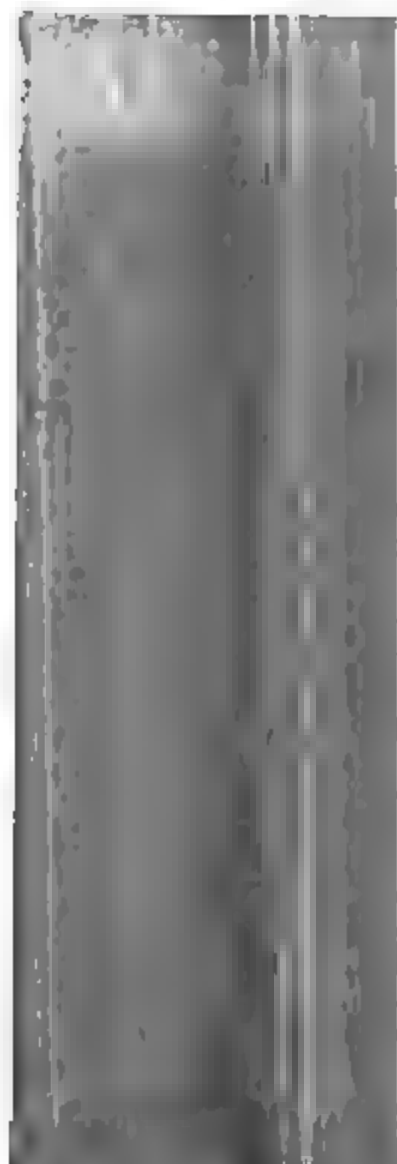
“Une Mission aux Iles Philippines et en Malaisie par M. le Docteur J. Montano.” Paris 1885.

“Die Philippinen und ihre Bewohner, Dr. Semper, Würzburg, 1869.”

“Revista de Filipinas” 1875 to 1877. Manila.

From the above works the one which I have had occasion to make most use of, is the Estudio Geológico of José Centeno, Inspector-General of the Mines of the Philippines, published by Royal Order at Madrid in 1885. Señor Centeno was commissioned





boiling springs, solfataras  
Besides the mountains above  
cones of less importance.  
his labours on Maquilin as  
they form together singular  
geological history of these  
have left very little for any  
they have ever been laid before  
I should mention further, that  
all my own collections with  
the Commission of the Forests  
has been gathered together  
I compared at the museum  
Municipale. I take this  
extreme courtesy of Señor  
the Curator of the Museum

SITUATION.—The Volcano  
in the midst of the Lake of  
in the Straits of Mindoro  
scarcely six miles in length,  
south, disemboguing a little  
its name from the crater. A  
church and a few important  
anchorage. On the north side

well-to-do centre of an agricultural district. It has a population of between forty and fifty thousand, and consists of the usual crowded streets of bamboo huts shaped like bee-hives, with a fine stone church in the midst, a ruined Casa Reale, and one or two other stone buildings of modest pretensions. It is a favourite watering-place, whose situation, the neatness of its streets, its fine Plaza, and the multitude of its houses give it a very picturesque appearance. This is much increased by the surrounding meadows, orchards, and gardens, all of tropical beauty and luxuriance. The climate, from its proximity to the sea, is said to be fresh and agreeable and free from the epidemic maladies of the islands. Nevertheless, the Spaniards resort to it but little. There are scarcely any European residents, the large population consisting almost exclusively of Tagalo Indians with a few Mestizos. When the Spaniards originally settled on this part of the coast they found a large native population established further from the sea and nearer to the lake, and here the missionaries built their church, and the officials their civil and military establishments. But all this and the town itself were destroyed by the terrible eruption of the volcano in the month of December 1754. When this ceased and the population began to return to their fields, the town was founded anew on the banks of the river, and as far as possible from the volcano. The ruins of the former town form conspicuous objects in the plain.

The parochial church is of the usual Spanish style, evidently constructed with a view to probable earthquake contingences. There is a Campo Santo or public cemetery of the kind usual in the Philippines, that is a combination of cemetery and catacomb. It is, however, far from the population and well-ventilated. There is a primary school, a monastery and a prison. The soil in the neighbourhood, like most volcanic regions, is very rich. Its principal productions are wheat, rice, maize, coffee, cocoa, pimento, —which includes pepper, capsicums, chilis, and other hot condiments —hemp, cotton, besides many vegetables and abundance of fruits. Moreover, as the country abounds with aromatic flowers, there are bees in abundance, from which the natives gather valuable stores

of honey and wax. In the wide and rich pastures of Taal there are large herds of live stock, including cattle, horses, goats and sheep. They also support many wild animals, including deer, monkeys, wild boars, foxes, porcupines, ferrets, hedgehogs; wild fowl, including ducks and geese, pheasants, pigeons, and snipe are abundant. In the town the principal industry is the production of cotton from the pods of the algodonero (*Gossypium*). The quality of the cotton produced is considered to be superior to that of almost any other portion of the Philippines. Great quantities are prepared by the population, and woven into a multitude of fabrics such as broadcloths and stuffs for wearing apparel, both coarse and fine, in which branch of industry large numbers of persons of both sexes are employed. They also dye the produce of their looms, and the colours they are able to give are brilliant and varied, besides being permanent. There is also a considerable amount of oil produced from the *Seacumum*, Til or Teel plant, mainly used in this country for illuminating purposes, and for preparing saltpetre. The seeds of the coconut (*Coccoloba*) are used

from five to seven pounds. The exports from Taal are to Manila only, and include large quantities of beeswax, honey, onions, garlic, wheat, large herds of cattle, and a great quantity of cotton stuffs. The latter fabrics being made by hand-spinning and hand-loom, are much stronger and more durable than our calicos. The thread is dyed before weaving, and thus the patterns are all plaids.

The Lake of Taal, Bombon or Bombong, in which is the volcanic island, is situated between N. lat.  $13^{\circ} 52' 4''$  and  $14^{\circ} 7' 42''$ , and E. long.  $120^{\circ} 47' 17''$  and  $120^{\circ} 59' 22''$ . Its figure is somewhat rudely heart-shaped, with a prolongation to the southward into a narrow bay. Almost in the centre is the volcanic island which is lozenge-shaped, the angles of the major axis being directed north-east and south-west. The circumference of the lake is about 75 miles, its greater diameter from north to south nearly 20 miles, and its least width from east to west nearly 13. The dimensions of the island will be given presently. It is sufficient now to say that it occupies a very large proportion of the lake area. The Cordillera which divides the province of Batangas and the province of Cavite, and the elevation of all the surrounding country give to the lake and its neighbourhood the appearance of a cauldron when seen from any eminence, a comparison first made by one of the early historians of the Philippines, Fray Martinez Zuñiga, whose intelligent geological opinions will be noticed presently. On the northern shores are the ruins of Tanauan, and on the south-west, as already stated, those of Taal on the banks of the river Pansipit, and to the north-west the ruins of the district of San Nicolas, and on the eastern banks the bed of the river Sala, near to which was formerly situated the town of that name. All these places were completely destroyed by the disastrous eruption of December 1754.

From the margins of the lake there is a gentle rise in certain portions with slight undulations forming fertile declivities of agricultural land, as for instance at Bañadero, Aya, Talisay, Bayuyungan, and in general on all the northern and western sides. In other portions the margins rise abruptly forming gorges and ravines mostly on the eastern side limited by Mount Macolod and

its dependent ridges. These extend parallel to the margin of the lake, like a wall bounding the rich and populous agricultural districts surrounding the large towns of Lipa, Cuenca and San José. All these towns are on a kind of plateau about 1000 ft. above the level of the sea. This plateau may be called the culminating portion of the land which surrounds the mountains Macolod and Sungay, and it slopes down gradually westward towards the river Pansipit. This as already stated is the only outlet of the lake, and by its very slight fall shows the very small difference there is between the level of the lake and the sea.

Of the two above-mentioned mountains, Macolod and Sungay, which with their dependent ridges, as it were, surround the lake, Sungay is on the north, and Macolod on the south. The highest point of Sungay is the Pico Gonzalez, which is about 2,200 ft. above the level of the sea. There is an extension of the mountain ridge to another peak called Ilong-Castila, distant about ten kilometers, and slightly less elevated than Pico Gonzalez. The elevation is continued by the Cordillera of Tagatay, which slopes down towards Mount Batulao on the south-west, whence extend ridges with a generally southerly trend, and filling up the land between the sea, the lake, and the river Pansipit.

Mount Macolod is about 3,243 ft. above the level of the sea. It forms a very conspicuous bluff, as already stated, on the south-east side of the lake. This mountain is quite precipitous on the lake side, and declines very rapidly towards the sea, sending a long peninsula out into the ocean, which forms the boundary between the two bays of Balayan and Batangas. On the north-east at some considerable distance is the extinct volcano of Maquilin, from the base of which spring forth the very hot springs of Los Baños. There is no river of any importance emptying into the lake, but in the rainy seasons there is considerable drainage from the slopes all round, which is supposed to be sufficient to counter-balance the evaporation. The weathering effect of the rains upon the loose volcanic soil must, I should say, be very great, especially during the summer monsoon when the downpour is so heavy and continuous. I noticed several large and rugged ravines, and I

was informed by the natives that the shore-line is very rapidly changing its contour. Many capes and points disappear during the rainy season, especially on the volcanic island which is composed of loose ash. In the Geological Essay of Draasch already referred to, the author puts forth well-grounded reasons for supposing the existence of thermal springs and subterranean affluents. Considering the great height of the mountains and ridges all round the lake, and the abrupt way in which some of them abut upon it, no doubt there must be a very extensive soakage into the bottom of the basin. At the time of my visit, which was at the close of an unusually dry season during which there had not been a drop of rain for nearly three months, there was a not inconsiderable stream of water flowing into the lake at the place where I embarked. This was on the low flat ground on the north-east side, at the nearest point to Mount Maquilin.

The depth of the Lake of Bombon is considerable considering its small extent. The deepest soundings are found on the south-east side where Mount Macolod abuts in precipitous cliffs upon the water. Here a depth of 106 fathoms has been obtained at a short distance from the shore. The soundings to the west and north are between 30 and 80 fathoms, and generally the lake is deeper towards the west than to the north. I noticed as we landed upon the island crater that there were several marine remains on the shore, such as dead coral and fragments of sea shells similar to what is generally seen on coral reefs in the open ocean.

Besides the island crater there are two or three little islands in the lake on the north-east of the strait, which separates the volcano from the Cape of De Lipa. The largest of these is Napayong, which is nearly a mile long and a third of its length wide. One side of this island ends in abrupt precipices of tufa, 350 ft. above the surface of the water. There are three other little islands and some rocks. These islands are generally precipitous, yet when the volcano is sufficiently tranquil they are inhabited, and in part cultivated. Cotton, Manila hemp, and bananas are grown, and a few live stock kept. The appearance of these islands is very picturesque, the whole of the precipitous

faces are richly festooned with the usual luxuriant foliage of wild vines and tropical plants.

Before coming to a description of the details of this singular volcano it will perhaps be better if I describe briefly the mode and times of my visits. I first saw it towards the end of March, 1885, when, after a long period of tranquillity, the volcano had subsided into a state of repose as great, almost, as ever has been known. I travelled from Manila up the river Pasig into the lagoon of Bay by means of a small trading steamer. I landed at the south side of the lagoon at the large and populous town of Calamba at the mouth of the river San Juan. From Calamba I followed this river which winds round the base of Mount Maquilin, and passing the town of San Tomas proceeded to Tanauan. This town is almost as important as Calamba, with a fine market place and Casa Reale all in ruins from the earthquake of 1882, or the hurricane of the year after. From Tanauan having crossed the river I descended to the margin of the lake, a distance of about seven miles. I may mention that from the town of Tanauan the peak of the volcano is visible, and was then specially conspicuous by the dense volumes of white smoke which rolled up from the crater high into the air, where, as the day was still and the weather fine, it formed a spreading canopy not unlike a mushroom in shape.

My journey was a most interesting one thus far, but I intend to give a description of it when publishing the full journal of my travels. It will be sufficient to say now that I embarked in a native canoe at the small village of Barnadero, and in an hour or so crossed over to the volcano. This appeared from a distance to be a low, undulating cone of grey ash, with very little vegetation upon it. I landed inside a cape called Caluit, or Calavita, and following a narrow path reached the summit of the crater by a very easy incline. The view from the edge is very startling and extraordinary. One stands on the edge of a crater of oval form, about 2,500 yards in its major, and 2,000 yards in its minor diameter, and about 1,000 feet deep. The first impression is that of a recently extinguished cauldron, from the midst of which two pits, a little separated from each other, were emitting rolling



volumes of thick white smoke. The general colour of the whole was red and fiery with bluish spots and stains on the sides, as if gunpowder had been recently exploded there. But what gave a singular and startling appearance to the scene was three lakes in the bottom of the crater, one in the centre, and the other two at the sides. The centre lake was a greenish-blue like the ocean, and surrounded by a broken crater of reddish-purple scoriæ. There was a confused group of half a dozen broken craters and one great slope encircling half of them. On the north side there was a bright emerald green patch like a pond covered with duckweed, except that its tint was more vivid than the greenest of green waters. This was succeeded to the north-west by another lake or rather a marshy flat of lemon yellow colour, which deepened on its edges into a golden colour, with great orange stains in places. The eastern and highest side of the crater wall was yellow with sulphur, and all this side was emitting thin jets of sulphurous fumes from cracks and crevices. Indeed most of the walls of the inside were emitting the same fumes. Close below where I stood there was a little jet of sulphur smoke, and on digging down with the iron point of an alpenstock, the ground around was found to be intensely hot.

The slope of the crater on the east side was a very moderate inclination, rendering a descent into it comparatively easy. Accompanied with two natives as guides, I descended easily to the bottom of the basin. The ground was firm and composed of a mass of broken cinders, but there was evidence that at no great depth these deposits were scarcely cool, as from the cracks and crevices sulphurous fumes were emitted. The yellow tint of sublimed sulphur was on everything.

I made my way first of all to the bluish-green lake in the centre. The rocks were exceedingly rough and scoriaceous, forming walls round one portion of the waters which afforded no foothold, but were quite precipitous. I found it very difficult to obtain samples of the water, but by means of a bamboo with which we were provided, and a sodawater bottle, this was accomplished. I next turned my attention to the green lake, and found the same kind



of difficulty in getting near the edge, which could only be done from the outer wall. The yellow lake was, at the time of my visit, about 120 yards in length, being a mass of sulphurous paste or crystals of sulphur with oxide of iron, the latter causing orange and reddish stains of considerable extent. Some of these crystals were of large size. In endeavouring to approach the edge of this lake, my Indian guides showed considerable uneasiness lest I should put my foot into some of the soft sulphurous mud which was in places quite scalding hot apparently. In some places one could distinctly see a bubbling up of steam, with patches of agitated water as if it were simmering. Any examination of this locality, I should say, would be fraught with considerable danger. It was my intention to examine the two smoking pits, but my guides displayed so much alarm at the proposition that I concluded there must be more danger in approaching them than I could perceive from a distance. The surface for a considerable distance around them was quite moist, and may have been boggy.

The heat was intense during the time of my visit, though it was

with such loss of life as in that historical disturbance in 1754, there was considerable destruction of property. The whole of the verdant slopes around the lake were lying desolate and blackened. A dark covering of cinders covered the ground as far as the eye could reach. There was not a trace of vegetation on the island where I had made extensive botanical collections. Formerly there were many herds of cattle, which, I was informed, were completely destroyed by the eruption before they could be removed. It had no doubt fared badly with the town of Talisay and four or five villages on the north side of the lake. During the height of the eruption the inhabitants had sought safety in flight, leaving their herds and their crops which were nearly all destroyed. From the little fishing village of Baguni Bayan, a distant view of the island volcano was obtainable. It was emitting very considerable quantities of white smoke with noises and explosions. Though the eruption had very much subsided, yet the emission of ashes and stones was quite perceptible. Even at this time any attempt to approach the volcano would be unsafe.

From what I could perceive at a distance, the form and appearance of many of the ash cones had been quite changed, and some of them obliterated. I was informed that the interior of the crater had been seen by some daring investigator, and that the green and yellow lakes were nearly obliterated for the time being, and the features of the crater quite changed. The time at my disposal during this second visit was occupied with the mollusca of the rivers, and the marine zoology generally, the results of which are appended.

I now proceed to describe the geologic features of the island, which will serve to give a better idea of the prehistoric activity of this volcano.

The island crater is an irregular square but prolonged at three of the angles into diagonal promontories. The north-west and south-western ones are clearly extinct craters. That on the north-east, or as it is termed Pirac Piraso, at its highest point (Mount Bignay) is about 220 ft. above the level of the lake. The north-western prolongation is named Binintiang Malaki. It is a

conical extinct crater about 850 ft. above the level of the lake at its highest part. Inside the truncated cone there is a well-formed crater about 500 ft. deep. There are no further observations to be made on the structure of this hill, except that it is very steep because it is densely clothed with vegetation. The abrupt sides though deeply scarred by ravines dip into the lake at a steep incline. It is here that I made the best portion of my botanical collection. The tangled thicket was principally composed of fig-trees belonging to three or four species, *Taberna-montana sphaerocarpa*, *Mussaenda frondosa*, *Acacia farnesiana*, *Canavalia*, *Vitis*, *Leea*, *Hibiscus*, *Abutilon*, *Mucuna*, *Oroxylum*, &c. with a host of escapes from cultivation to be described hereafter.

The point to the south-west is named Binintiang Munti, a much smaller crater with less vegetation. The basin inside the cone is imperfectly defined, and only about 250 ft. above the level of the lake. From the edge of this crater there is a ridge pursuing a north-east direction towards the volcano. This ridge terminates at a dome-shaped hill called Mount Tabaro, which is about 100 ft. high. This mountain has a small crater at its summit, the sides

on the south-east side, about 1,000 ft. above the level of the sea. From this point it descends on the north-east and east-south-east to less than half the altitude mentioned. It then rises to the north to a height of about 785 ft. On the north-east side there is a crest with steep sides terminating in an extinct crater named Pinag Ulbuan, of an elevation of about 600 ft. It is about 400 yards in diameter, with a deep channel on the north-east side leading to the lake. On the north side of the island between the volcano and the sea, there are six or seven ridges of ash, and about the same number of mountain peaks, the most important of which are Lagatan and Matas-na-Golod, both between five and six hundred feet above the lake.

Between the volcano and the north-west angle or Cape named Binintiang Malaki, there is an interval of about 700 yards, and then the surface rises abruptly into an ancient crater called Balantoc, which is the largest of all the extinct craters, and about half the size of the present active basin. It was evidently at one time a central point of activity. It is elliptical in shape, about 350 ft. high on its eastern side, and with a channel or gorge on the west leading down to the lake. The interior of this crater is very abrupt on the north side, and less so on the south. It is all covered with dense jungle of a kind similar to that described in the crater of Binintiang Malaki, with whose ash deposits those of Mount Balantoc mingle. To the south of the mountain there is a series of small craters called Las Canas. They are seven in number, at least that number have pretty well defined circular forms, but there are others of irregular outline, which seem to have been partially destroyed as new ones were formed. The name Las Canas is derived from the shallow pans which are used in this part of the country for boiling sugar.

It need scarcely be said that, with a soil composed of loose pulverulent ash and fragments of scorise, cinders and pumice of every size, water would not rest upon the surface, especially as the slopes are so highly inclined for the most part. In the wet season the rain easily cuts down the loose materials of the sides of the active crater. Thus I noticed in going to the edge several

deep crevasses or dry water-courses of very rugged and broken appearance, with a certain amount of tangled jungle in the bottom. The inhabitants get water from wells near the side of the lake, though, as already observed, the water in the lake itself is only slightly brackish. In Australia we should consider such water quite serviceable for all domestic purposes.

**GEOLOGY.**—The exterior slopes of the volcano are of uniform character, composed of volcanic sand, scorise, breccia, tufa, alternating in strata of diverse thickness and different colours. I was surprised to see the difference there was between the colour of the soil and the appearance of the volcano from a distance. It was yellowish brown when near, with fragments of yellow, black, and white rock. At a distance it appeared grey. There was the strongest contrast between the nature of the walls of this crater and that of Bromo in Java. The latter had crater walls of loose grey ash so fine that one sank into it ankle deep in ascending the slopes. There were, of course, larger fragments of stone and scorise, but the general character of the ash was exceedingly fine. Bromo continually emits a roaring noise, which is like a succession of violent explosions, which follow each other with such rapidity as to mingle the vibrations. These explosions, I have no doubt, are the cause of the fine fragments or dust into which the cinders of the volcano are blown. At Taal, on the contrary, there is scarcely any sound, and there are not consequently the detonations and explosions causing the fine rain of volcanic dust. The greater part of the slopes of Taal volcano, and especially on the north side, is covered with a fine stratum of ash decomposed into alluvium. In the lower portion there are large trachytic blocks, especially on the east and south-east sides. In the "Barrancos" or gullies already spoken of, scoriaceous lava streams of very hard dolerite can be perceived. I append at the end of this paper a description of the various minerals which are met with on the slopes of the volcano. This list, which is that of Señor Centeno, will afford me an opportunity of mentioning any details or observations which may be necessary

**BININTIANG MALAKI.**—This, as already stated, forms the north-western prolongation or angle of the island. It is a small mountain in the form of a truncate cone. It has been beyond all doubt a true crater and point of ejection. Its slopes are highly inclined, and end precipitously in the lake on the north and north-east side in the deep waters of the lake. In order to ascend to the summit, one must land at the bay Panipihan on the north side. This gives an easy approach to the easterly slopes, which are gradual and admit of easy ascent. The crater is formed of regular strata of lapilli. At the base of the slope on the north side there are certain traces of the former volcanic activity in the form of small jets of gas which gush out below the water close to the margin of the lake. These gas jets are of such a high temperature that the water near them raised the mercury in my thermometer to 130° of Fahrenheit. Señor Centeno gives a temperature of 75 Centigrade, but this I suppose would depend upon the position of the thermometer with reference to the jet of gas. The water near the jets was very pungent to the taste. On the north side of the crater its height is about 500ft. above the level of the lake. From the north to the south the margin rises in the form of an amphitheatre to a height of about 850ft. above the lake, and 350ft. above the plain. The crater is about 300 yards in diameter, and is covered with vegetation. At certain seasons of the year a small portion of the base is cultivated, and some of the more hardy descriptions of rice, or those which bear a dry soil, are grown on the more level ground. The vegetation has already been referred to. The grass most abundant was *Imperata arundinacea*, the lalang or jungle grass of the whole of the Malay Archipelago. There is a deep barranco cutting down the crater to the edge of the plain, and serving to drain the water which falls into it in the rainy season. There are no remains of volcanic activity in the bottom of the crater, but there is a crack on the south-east edge of the summit, which emits abundance of white vapour. From this point to the plain the soil is covered with a thin white crust, under which the earth is black, and so hot that, at a few inches beneath the surface, it rises to within a few degrees

of the boiling point of water. At the bottom of the crater the soil is composed of detritus, which the rain has washed down from the sides. Señor Centeno considers that the great steepness of the north side shows that the volcanic activity ended in that direction, at any rate it proves that it was greatest on that side.

ANCIENT CRATERS OF BALANTOC AND LAS CANAS.—Between the active volcano and Binintiang Malaki there is, as already stated, another crater. It is much less elevated than the last, though considerably wider. The whole is covered with abundant vegetation, and the rocks are much more decomposed than the last. Moreover, there is not the slightest trace of any activity still going on. It seems to belong to the very early history of the volcanic activity in the island. Everything about it seems to indicate an older crater. To the south of Balantoc and separated by a deep watercourse about 40 ft. wide, is the curious region already referred to as Las Canas. It consists of a number of small craters close to one another or breaking in upon one another, and covering about 500 acres of ground. Two of these are larger

area of volcanic disturbance or the subterranean fires is very large, extending, as it does, for fifty or sixty miles in a straight line, and in some places of almost equal width. Now in a volcanic eruption many a fissure and many a fiery jet become covered up and obliterated by the immense fall of ashes and cinders, but, of course, only to break out in some new direction close by. The one central point is the volcano, but even this is full of little craters inside it, as we shall see presently. One is disappointed at seeing so little of the fires, but they are so completely covered with ashes and scorixæ, that sulphurous vapours and steam are the only evidence that we see of what is going on underneath. Every now and then a more powerful explosion casts the light and porous covering of cinders into the air, but the most of this falls back again and the vapour goes on escaping as before. What we see at Las Canas is similar to Vulcano in the Lipari Isles of the Mediterranean, in which, by the shifting of the centre of volcanic activity along a line of fissure, a series of overlapping volcanic cones has been produced.

It will be seen subsequently that there is reason for believing that the whole of the lake around the volcano is an area of subsidence, which represents the former extent of an immense volcanic cone. We have, therefore, according to this theory, only a portion of the later history of the volcano revealed to us, with the evidence of those forces which have tended to modify the form and character of this volcano, which, according to Mr. Judd's classification, is one of composite character. In his *Work on Volcanoes* he points out (p. 161), that the sides of such cones are liable to be rent asunder from time to time, and the fissures so produced are injected with liquid lava from below. These fissures rent in the sides of volcanic cones often reach the surface, and eruptive action takes place, giving rise to the formation of a cone or series of cones upon the line of fissure. Such small cones thrown up on the flanks of a great volcanic mountain are known as parasitic, and, though subordinate to the mountain mass, they are sometimes themselves of considerable dimensions. Amongst the hundreds which stud the flanks of Mt. Etna, there are some nearly 800 ft. high.



Between Las Canas and Binintiang Munti there are only the two elevations spoken of already as Mt. Tabaro and Mt. Saluyan; the rest of the plain is composed of slopes of ash, modified by barrancos which have been due to weathering.

**BININTIANG MUNTIL.**—This is a small ancient crater, so much worn down by weathering as to be only about 50 or 60 ft. above the level of the lake, and limited on its north-east and south-west sides by two small ridges, which are the remains of what was once the much more elevated rim of the crater. It has a depression in the centre, and is of horse-shoe form, about 500 yards across at its widest point. The slopes of this small cone terminate in the lake, with undulations on the surface giving rise to a number of small points which afford excellent sections. These display in a very complete manner the different strata which have arisen from eruptions at various times. One sees that the crater is built up of tufas and conglomerates of various colours and fineness, of very distinct character. Señor Centeno gives a list of these various deposits, but on comparing his list with some of the sections

Before proceeding to the consideration of the interior of the great crater it is desirable to summarize the evidence which is afforded us by a study of the geology of the island. First of all it will be observed that there are two lines of volcanic fissures, made manifest by the shape of the island and the dispositions of the craters. The first is from south-west to north-east, beginning with the extinct crater of Binintiang Munti, and ending at the north-east cape of Pirac Piraso. Along this line, which passes through the highest portion of the central volcano and the most of its extinct craters, we have a line of ancient craters, which from their appearance would lead one to believe that they are also the oldest of the island. These are Binintiang Munti, Saluyan, Tabaro and (omitting now the central craters) Pinag Ulbuan, Ragatan, and the islands in the Seno de Hog Hog, which appeared to me to be very much like the remains of an ancient crater.

At almost right angles to this line of fissure there is another line, which would take in Las Canas, Balantoc, and the cone of Binintiang Malaki on the north-west. The second line of fissure would appear to be of a more modern character. I think a careful study of the volcanic evidences here exposed must throw some light on the chronology of these different basins, and possibly also upon the great question as to whether there has been a large subsidence where the present laguna now stands. It should be remarked that the greatest diameter of the lake corresponds nearly with the first described line of fissure, and also with the greatest prolongation of the volcanic tufas and trap-rocks.

INTERIOR OF THE GREAT CRATER.—I now proceed to describe the features of the great centre of activity in this island. First of all I shall give the impressions made upon my mind by a first view from the brink. The effect was certainly very wonderful and startling, so different indeed from anything I had ever seen before that it amazed me with most bewildering sensations. The first thing that strikes one, of course, is the source and origin of all the clouds of white fumes which are always rolling upwards out of the crater, and make it so conspicuous wherever seen. These vents

look rather smaller than one would anticipate from the great clouds of white smoke which unceasingly issue from the mountains. Still they look large enough and very significant of the volcanic forces below. The next thing which attracts the notice, is the extraordinary variety and vividness of the colours on the rocks, and in the lakes. First of all there is the large irregular shaped basin of bright emerald green water, extending like a pond at least half way round the crater. This forms such a strong contrast with the sulphur flat of lemon yellow, golden and orange. In the centre of the basin there is an extinct crater forming a somewhat smaller lake of pale bluish green water, which is like a turquoise set in copper, for this is the aspect of the purple-red crater walls nearly all round. To the left of this and underneath the highest part of the crater walls, are the two smoking craters, and above this the steep slope of the wall is all smoking, and quite yellow with a sulphur incrustation. The walls themselves are stratified in coloured lines of pale yellow and brown. This however is by no means uniform for there are gaps, crevices and

about a league in circumference. From the midst of this there always rises an immense column of whitish fumes. The edge of the crater is easily reached, and one looks down an appalling depth. At the bottom is a small pond about 70 yards wide, from which the fumes are exhaled. The waters are a dark green, and encrusted all round with deposits of sulphur, soda, lime and magnesia. The interior is rugged but firm, and forms almost a natural staircase down to the water which can be reached with a little careful climbing. It is the most accessible crater in the world, and offers hundreds of sights to the traveller. The interior surface is seen to be composed of lava, cinders, fine sand, pumice and great quantities of sulphur and crystalline salts of soda, magnesia and lime. When seen from the edge they have a yellowish colour, and every now and then they are thrown into violent ebullition, accompanied by a roaring noise. From the bubbles caused by this spasmodic boiling, dense white fumes emerge, and these form the column of vapour which is seen from afar rising from the crater."

If this description was taken from actual observation, which I am inclined to question, though it occurs in the "Boletin de la Comision del Mapa Geologica del 'España, Vol. III," the change which has taken place in the crater since 1872 is very great. No mention is made of the two small smoking craters, and there is only one lake spoken of instead of three which I saw. The description of Señor Centeno comes nearer to the state in which I saw it first, but still there are differences. At the early part of his visit descent into the crater seemed so difficult that it was only undertaken with many precautions in the way of ropes and other aids. He describes, first of all, the reddish yellow lake which occupied all the north-east part of the crater. Its margins were covered for fifty or a hundred yards with abundant concretions of various colours, yellow, red and white. These consisted of sulphur, oxide of iron, alum and gypsum. The sulphur was crystalline or encrusting; the iron oxides formed a film more or less thick arising from the decomposition of the scorïæ. Alum and gypsum were present in large handsome crystals. The gypsum was in thin tabular crystals disposed vertically and horizontally upon one

another. The margin of the lake, which is alternately washed and left dry, was a soft and steaming mud full of little fumeroles of vapor in places with the temperature of boiling water. In other places the mud was white with a temperature of about 100 degrees. Every now and then this lake came into a state of slight ebullition, during which time the surface bubbled, throwing up small quantities of mud a short distance above the surface. Señor Centeno was unable to ascertain the depth as the margin cannot be approached except on one side. It appears to be very deep, with a temperature of about boiling water. The taste was acid and astringent.

This was much the state in which I saw the lake except that the signs of ebullition were very faint, and the whole appeared to have cooled down considerably since the visit of the Spanish geologist. The accompanying map with a dotted line will show the track of Señor Centeno which I followed to some extent, except that I did not go so far round the yellow lake. He surrounded all the southern margin of this lake to the point N, on

fumes were rising in intermittent clouds with a faint murmur like boiling water. The width of one of these pits was about 20 yards, and of the other about 40 yards, but I only judged of these from a distance: they were perhaps 100 yards apart.

As I have already stated, the interior of the walls was tinted with all sorts of colours, very much like a furnace or a kiln on a gigantic scale. They were composed of loose ashes and scorise, but sometimes molten together and twisted like splashings of furnace-clinker on a large scale. There were great bosses of sulphur and other minerals, probably gypsum or felspar or lime, but it would be a very long business to describe the whole of the appearances along the sides of the crater. The whole of this heterogeneous mass of rock—as Señor Centeno well expresses it—is broken up and confused by landslips, deep cracks, and loosening of the strata, produced sometimes by the rains, by interior emanations and explosions, or finally by great earthquake shocks, to which the crater must be exposed at periods of unusual activity.

The following is an analysis given by Señor Centeno of the water of the yellow lake:—

<i>Analysis.</i>					<i>Grammes.</i>
Sodium chloride ...	...	...	...	...	15·9412
Potassium chloride	...	...	...	...	0·7095
Iron chloride ...	...	..	...	...	4·1907
Iron sulphate ...	...	...	...	...	0·5693
Aluminum sulphate	...	...	...	...	0·9360
Magnesium sulphate	...	...	...	...	1·3200
Lime sulphate ...	...	...	...	...	0·5100
Free sulphuric acid	...	..	...	...	1·5855
Silica ...	...	...	...	...	0·6400
Sodium phosphate	...	...	...	...	0·5867

---

26·9889

The above was the result of an examination of the solid contents obtained by evaporation of one litre of the water. I have two other analyses from different authors, which differ only slightly from the above.

Señor Centeno mentions the mode in which the phenomenon of ebullition is manifested at this part of the crater. There was a periodical boiling up about the centre of the waters, which were raised for the time being into a kind of jet, from which mud and clay were thrown out with a noise like the boiling of a cauldron. This must be due to a periodical escape of gas, somewhat similar to what is taking place in the smoking craters.

*Green Lake.*—At the time of Centeno's visit the green lake was absent or possibly merged in the yellow one, but it was by far the larger in 1885, and in fact the yellow lake seemed only a shallower prolongation of it, with a margin of sulphur and felspathic mud at the time of my visit. The green colour was, as I have said, intensely vivid. The waters were singularly still, but in Centeno's time they were continually emitting sulphurous vapours. The margins were precipitous on all sides, and higher on the south-east, making it impossible to get near enough, with the means at my disposal, to obtain any specimens of the water. It will be seen

vapours were continually ascending from its waters. Its margins are precipitous on all sides, but higher on the south-east, where I should say they rose between 80 and 90ft. high and almost vertical. It was full of mineral water, with a temperature which appeared to be almost boiling. The sides of the lake were covered, in 1883, with crystals, but I saw nothing of the kind, and the water was not steaming, but apparently still and cool. It would require a very long cord to reach the water, at least longer than any I possessed, so that I could not obtain specimens. Señor Centeno was more fortunate; he obtained some after a little difficulty. He says that though of a deep green at a distance, in the bottle it was of a very pale colour. The taste is more acid, bitter and salt, than the water of the yellow lake, and gives a much more abundant precipitate on evaporation. The following is the result of an analysis made by the official chemists at Madrid :—

<i>Analysis.</i>					<i>Grammes.</i>
Sodium chloride . . . . .	...	...	...	...	30·8588
Potassium chloride . . . . .	...	...	...	...	3·4716
Iron chloride . . . . .	...	...	...	...	9·6736
Lime sulphate . . . . .	...	...	...	...	0·4644
Magnesium sulphate . . . . .	...	...	...	...	3·0600
Iron sulphate . . . . .	...	...	...	...	1·6772
Sodium phosphate . . . . .	...	...	...	...	0·7620
Silicic acid . . . . .	...	...	...	...	0·7400
Free sulphuric acid . . . . .	...	...	...	...	1·4888
Free hydrochloric acid . . . . .	...	...	...	...	7·8264
					<hr/>
					60·0228

This was, as in the former instance, the result of an analysis of one litre of water. The proportion of solid matter is unusually large, and the amount of chlorides quite extraordinary.

*Red Crater.*—Near to the green lake there is a circular crater, about 400 ft. in diameter and 70 or 80 ft. deep, with almost vertical walls. It is filled with volcanic detritus and scorise of a fiery red colour, and, during the rainy season, it is said to be filled



with water of a similar tint, which contrasts with singular brilliancy with the neighbouring lakes. My visit being at the end of an unusually long dry season did not permit me to see any water in this crater.

The Spanish author whom I have followed hitherto, here describes an active cone about 300 metres to the south of the green lake. He says it is a small but very perfect cone, composed of ashes and scorix, with a circular basin, from which emanate continually those unceasing clouds of white vapor which render this island so conspicuous. This cone, he says, can be approached to within 50 or 60 yards. It is about 50 ft. high, with a diameter for the crater of 18 or 20 ft. There was, he says, a constant murmur, like that of the boiling and bubbling of some viscid liquid, which could be heard 500 or 600 yards away. Presuming that this is the larger crater from which the white fumes continually emanated at the time of my visit, it has changed very much in appearance. I should say that this has been due to a constant

jets from top to bottom. Wherever they occurred a little efflorescence of yellow colour could be also seen.

The track which leads down to the crater, or rather the tracks, for there are two, were well beaten, as if they had been well used by many travellers and by the Indians. They were made of zig-zag shape, so that there was not the slightest difficulty nor danger in either ascending or descending. I noticed in many places by the side of the track, small sulphur fumes, and, as I have already mentioned, an iron point thrust into the ground showed that at no great depth it was red hot. Since the last eruption no doubt all these conditions have changed, but I was told by one of the Indians that the slope of the sides was still the same. In any case, supposing that there was no change, I should strongly advise any tourist never to descend alone into the crater, even with guides, for the dangers, though not very apparent, are really very great. The heat and vapours are, at best, almost overpowering, and a very slight change of the conditions might intensify both to an extent incompatible with the existence of human life. Such changes must be constantly occurring even in the most tranquil periods of the volcano's history.

Barometrical measurements prove that the level of the waters in the crater is about the same as the level of the lake. It would be difficult to suppose any connection between the two. Señor Centeno suggests that the waters are entirely due to the internal drainage during the long and heavy rainy season in this locality, and that the heat causes them to have a strong chemical action, dissolving the felspars, sulphates, and chlorides, with which they come into contact. The heat of course is supplied by the volcano. Something of this kind must be the true explanation, but one is at a loss to know why similar phenomena are not seen in other lake craters. The crater of Bromo, in Java, is perfectly enclosed, but there is no accumulation of water at the bottom, and other instances might be cited. Usually extinct craters are full of water, and this is the origin of some of the most beautiful lakes with which the surface of the earth is adorned. "As crater-rings are usually composed of materials more or less impervious to

water, they often become the site of lakes. The beautiful circular lake of Laach, in the Rhine Provinces, with the numerous similar examples of Central Italy—Albano, Nemi, Bracciano, and Bolsena—the lakes of Campi Phlegrei (Agnano, Avernus, &c.), and some similar lakes in the Auvergne, may be adduced as examples of crater-rings which have become the site of lakes.”

“One of the most beautiful of the crater-lakes in the Auvergne is Lac Paven, which lies at the foot of a scoria-cone, Mont Chalme, and is itself surrounded by masses of ejected materials. The crater-lake of Bagno, in Ischia, has had a channel cut between it and the sea, so that it serves as a natural harbour. The lake of Gustavila, in Mexico, is an example of a crater-lake on a much larger scale.”

“In many of these crater-rings the diameter of the circular space enclosed by them is often very great indeed as compared with the height of the walls.”

“Two of the largest crater-rings in the world are found in Central Italy, and are both occupied by lakes, the circular forms of which

and which is the type of many other extinct craters in the colony of Victoria. This is the series of lake-craters of Mt. Gambier in the colony of South Australia, forming a piece of enchanting scenery, which has won an almost world-wide reputation. I have already, in my "Geological Observations in South Australia,"\* given a description of the blue lake, which is a perfectly enclosed basin, about half-a-mile wide, with precipitous sides and a varying depth between 200 and 300 ft. The waters are a dark blue like the open ocean, but they are perfectly pure and limpid, without any excess of solid constituents, unless it be that of lime.

This is the more extraordinary when we reflect upon it, for usually in lakes that have no outlet, concentration of salts, due to evaporation, gives rise to well-marked chemical characters in the water. The small amount of water does not exactly explain this, because there must be a very considerable quantity in the crater of Taal. No matter what eruptions and changes have taken place, as soon as things get a little settled the lakes are always there in one shape or another. They are always referred to by every historian, though differing in number and shape and sometimes in colour, there has been always a general resemblance, which marks them out as distinctive features of this volcano. They are generally confined to one side of the basin, and usually occupy much the same limits. If they were derived from surface drainage during the rainy season, why are there not waters in all the extinct craters, such as Las Canas? But the soil is too porous for rain waters to rest upon it, and there are scarcely any surface accumulations at any part of the island.

For my own part I am inclined to think that these lakes owe their origin to some peculiarity in the emanations of this crater. Volcanoes vary very much in their products. There are some volcanic centres from which only one kind of lava has been emitted, but there are others in which the changes in the material thrown out are as unceasing as they are unaccountable. Water is always an accompaniment of whatever is emitted from volcanic vents. Water of course in the form of steam. "Along with this steam

---

\* London, Longmans 1863, 8vo, 404 pp.

the most common substances emitted are two gases, sulphurous acid and sulphuretted hydrogen. When these two gases come into contact with one another, chemical action takes place, and the elements contained in them—oxygen, hydrogen, and sulphur—are free to group themselves together in an entirely new fashion: the consequence of this is that water and sulphuric acid (oil of vitriol) are formed, and a certain quantity of sulphur is set free. The water escapes into the atmosphere, the sulphuric acid combines with lime, iron, or other substances contained in the surrounding rocks, and the sulphur builds up crystals in any cavities which may happen to exist in these rocks.”—(Judd's Volcanoes, page 19.)

Without propounding any new theory, there must be something special in the nature of the underground rocks which causes them to manifest themselves in the peculiar features of this crater. The quantity of sulphur in it seems quite exceptionally great, as well as the chlorides, and these are quite sufficient to account for the large quantities of hydrochloric and sulphuric acid which are found combined with the waters

the tufaceous region of the volcano of Taal, attains to considerable thickness in certain localities, with a distinct structure in its cinders and pumice according to the extent and duration of the various volcanic eruptions. In making the excavations connected with the Manila Waterworks the tufa has been sunk through for nearly 30 feet. The section showed that the different strata were separated by a deposit of fine volcanic sand, which marked the period of comparative repose in the eruption. There are, of course, many other extinct volcanoes in the region now referred to, such as Banajao, Majajay, Maquilin, and many others on the side of Laguna de Bay. But some of these have not been in activity within recent times, yet it is thought possible to assign to each whatever share it may have had in producing the tufaceous deposits. This will be considered by some to be open to question, but, at any rate, there can be no doubt that a very large quantity of ash deposit has come from the volcano of Taal, and that this quantity is largely in excess of what can reasonably be attributed to the present crater.

The physical geography of the Laguna of Bombon is an argument which is also relied upon. It is separated from the sea by only a very narrow strip of land, and this is entirely composed of ash deposits. The lake itself is brackish, and has an extensive marine fauna in its waters. They said that sharks are found in it to an extent which prevents the natives from venturing into its waters at any distance from the shore.

It is hard to see how these facts can be regarded as settling the matter one way or the other. Supposing the lake to have been separated from the sea by the gradual filling up of a narrow strip of land through which the river Pansipit now flows, the appearances would be still the same. As to the fishes, it is a well-known fact that sharks will ascend fresh-water rivers for a considerable distance, besides other marine fishes. The fishes that I saw amongst the inhabitants of the lake were fresh-water Siluroids, and the mollusca were decidedly fresh-water, including the genera *Melania*, *Paludina*, *Unio*, *Cyrena*, and *Corbicula*. The same species are found in the Laguna de Bay.

However, it is fortunate for the theory that it does not depend for its support on such reasoning. It has a much more powerful, and, to my mind, convincing support from the present configuration of the sides of the lake. There we find that its margin is in very many places formed of high cliffs, sixty or seventy ft. in height, and in a few localities, such as Macolod, &c., the waters are confronted by precipices between 2,000 and 3,000 feet high. To quote from Señor Centeno: "If we observe Mt. Macolod with a height of 966 metres and the rapid slopes of its sides toward Cuenca, and its equally sudden breaking off at the water's edge, we cannot help seeing that we have here only a fragment of what this original mountain has been, and that some extraordinary change has taken place since it was deposited in strata of ash. If we observe the opposite portion of the laguna we shall see that the cordillera called Tagatay—which is the limit of the lake to the north, and is terminated on the east by Mt. Sungay—has meridional slopes of rapid inclination, which terminate in escarpments on the side of the lake; such, for instance, as Mahabangbato in the village of Pangasinan, Bala-Bato, and the Keukan. In the precipitous

the face of them a stamp of probability which is fully warranted by the facts of the case.

The theory receives new support from what has been recently observed in connection with volcanic eruptions, and a reflection on what really takes place during their continuance. It must be obvious that such immense deposits of tufa can only have been supplied by the transfer of enormous quantities of material from below. The cavities and chasms thus caused in the course of time must have been so great as to defy calculation. Just imagine the amount of material scooped out from great depths to cover the surface for nearly 100 miles north of Taal, and 10 to 30 miles wide. It would be hardly possible for so much of the lower portions of the earth's crust to be taken away without subsidences and failure of support in some direction. When even the much more moderate subterranean excavations of our mining operations cause land-slips and extensive subsidences, how much more likely is it to anticipate some failure of support from the unceasing activity of a volcano. There is little doubt that it was to some such cause as this that the catastrophe of Krakatoa owed its origin. That island-volcano had been belching forth for months unceasingly rock-material in the form of ashes and scorïæ, until the land for more than 100 miles, and much of the intervening sea, were strewn thickly with them. At last it would seem that the cavity thus arising allowed full entry of the sea to the innermost depths, where the subterranean fires were raging. Hence the awful explosions which were heard in terrific distinctness 900 miles away ; hence the concussions which disturbed the very foundations of the earth, until at last the earth's crust collapsed, the island-crater toppled over and fell in, and the regurgitation of the water carried dreadful destruction on to the neighbouring lands in the form of tidal waves. The island-crater of Krakatoa was partly submerged and disappeared. Fragments of the crater-walls, now raised in broken and precipitous faces to 1,500 ft. and more above the waters, are memorials of the way in which the volcano was torn and split asunder, but where its highest wall stood is now marked by 100 fathoms of ocean.



It is no far-fetched or unreasonable hypothesis, therefore, to suppose that this has been the history of the volcano of Taal, and this has been the way in which the lake of Bombon has been formed. The broken sides of Mount Macolod and the other portions of the lake all attest the violence of the catastrophe, while the depth of the lake itself shows us something of the dimensions of the mountain which sunk down. As I sailed round the bay in the lake called the Seno de Lipa, I had a good opportunity of closely examining the precipices at Punta Calinana, where the structure of Mount Macolod is fully exposed. The strata are disposed in such regular order and with such a uniform dip, that one cannot resist the conclusion that we see in them a fragment of the steep sloping walls of an immense volcanic cone.

In order to examine and test the hypothesis more closely, I left Point Caluit early in the day and coasted over to the opposite shore, and then poled round the lake close to the margin, except where it was too precipitous for the boatmen to do so. I passed round the Punto de Lipa between Napayong Island and the shore.

the submerged mountain, according to the reconstruction of Señor Centeno, is a reasonable theory, and one which accords in a satisfactory manner with the evidence.

It is a singular fact that one of the most respectable of the historians of the Philippines should have taken this view of the history of the Taal volcano. In the "*Historia de las islas de Philipinas compuesta por el R. P. lector Fr. Joaquin Martinez de Zuñiga*," the following passage occurs:—"There are in this island several volcanoes as that of Mayon, which is between the provinces of Albay and Camarines. It has a sugar-loaf figure, and is of such altitude that it may be discovered at an immense distance at sea. The de Taal is of a similar form and stands in the middle of a large lake called de Bombon ; it exhibits sufficient proof that the mountain in whose top the volcano was, has sunk, remaining, however, still pretty much elevated above the water."\* In giving Zuñiga credit for this theory, it must be added that he was not the author of the book which bears his name. He was an Augustinian monk, selected probably by his order to edit the papers of a deceased friar, whose name has not come down to us. The work was published in 1803, but it concludes with the ratification of peace in Manila, and its restoration to the Spanish Government by the English in 1763. The real author evidently concluded his chronicle at that date, and it was not until nearly 50 years afterwards that the Augustinians resolved on its publication. The friar, whoever he was, had visited the volcano, for he says in the 12th chapter of the 2nd. volume—"In the commencement of the government of Don Pedro Manuel de Arandia, in the month of December, 1754, there happened a terrible shock of an earthquake, and the Taal, which is in the middle of the Lake Bombon in the province of Batangas, threw out such an immense quantity of cinders, as completely to ruin four towns which were situated near the lake, and the inhabitants found it necessary to retire a league further into the interior. Many other severe shocks followed, accompanied by loud reports similar to those of contending squadrons,

---

\*It is not generally known that there is an English translation of this work by John Maver, published in London in 1814, by the booksellers to the Hon. E. Ind. Co., Leadenhall-street.

guava has been a matter of controversy, but the question has been confined as to what part of tropical America or the West Indies it belonged. It has been pretty well decided, however, that it came from the south portion of the continent. Probably there are few plants which germinate so easily and so rapidly, and it fructifies usually in the third or fourth year; its area has thus spread, and is still spreading, by naturalisation in those tropical countries which are neither very hot nor very damp. There are about 60 species of the genus *Psidium* known. Their fleshy and somewhat aromatic fruits especially attract frugivorous birds, which carry their seeds to places far from cultivation. There is scarcely any fruit which germinates so easily, and requires such little care in its cultivation. I. Acosta, in the "Histoire Naturelle et Morale des Indes Orientales et Occidentales" (French translation, 1598, p. 175), tells us that in mountains of San Domingo and other West Indian Islands the land was entirely covered with guavas, and he adds that the natives said that there were no such trees in the islands before the arrival of the Spaniards, who brought them. De Candolle, in his "Origin of Cultivated Plants," (p. 241), from whence I have taken the above quotation, gives references to Hernandez, Piso and Marcgraf, all early historians of New Spain, The Brazils and Peru, to prove that the guava was not known until the Spaniards discovered America. The name of the guava is probably Peruvian, and was formerly guajavos or guajava.

There can be very little question, therefore, that the guava was brought to the Philippines by the Spaniards, and it could hardly be growing wild or widespread in the islands until the close of the 16th century. This would give a very recent date to the tufas in which the fossil leaf impressions were found. I have no particulars as to where, or in what numbers, the specimens were discovered, nor how deep down in the ash deposit. We may presume that they were not deep down, and that they belonged to some of the destruction caused by the most recent eruptions of the volcano.

This brings us to the question as to what was the state of the volcano when the Spaniards first took possession of these islands. First of all it must be remembered that Luzon was not the earliest

colonised island, nor probably was it seen, except at a distance, at the time of the discovery of the group in 1519. Manila was founded in 1571, but we do not find any detailed account of the island for more than 100 years after that. It is said by Señor Centeno, though he does not cite any authorities, that there are ancient documents in existence which would seem to indicate, though not in a very reliable manner, that the volcanic activity was, at the time of the Spanish conquest, confined to the north-west extension of the island in the now extinct crater of Binintiang Malaki. So recent an activity is hardly borne out by the appearance of the rocks, but inasmuch as there are still some signs of eruption visible, such as the emanation of gases, steam and heat, the thing is just possible. We know from experience how very rapidly these subsidiary craters form and disappear. To cite no other instances, the parasitic cones of Etna and Ischia are good examples of this sort of formation.

When at the end of the 16th century, says Centeno, the principal towns of the province of Batangas were founded, there did not exist amongst the inhabitants of those localities any tradition worthy of credit, of eruptions or notable cataclysms from this volcano. If there were such they have not been registered in historical documents. The most ancient chronicle that he was able to consult was that written in 1680, by Dr. Fray Gaspar de San Agustin, preserved in the ancient library of the Augustinian monastery at Manila. I visited this establishment, which is one of the splendid architectural curiosities of the city, and whose library, church, and traditions are historical monuments of extraordinary interest and value. Through the kindness of the Provincial, the muy Rev. Padre Fray Felipe Brabo, and the Rev. P. Fray Raimundo Lozano, the Definidor of the order, I was able to visit the library, and make some investigations amongst the valuable chronicles which they possessed. It is not of much importance to cite the whole of the quotation from Fray Gaspar, who relates the precautions taken by the parish priest of Taal to deliver the inhabitants from certain supernatural inconveniences which were supposed to be connected with the volcano of Taal. The important

points in this chronicle are the facts given as to its actual state in 1680. Padre Alburquerque, parish priest of Taal, states that he went to the edge of the volcano, which had within its crater two principal mouths—one of sulphur and one of green water, which was always simmering, to which many wild deer came for the sake of the salt which was found on the edge of the lake. This testimony is important as showing what was the state of the volcano at that time, and how comparatively tranquil it was. Since then, it would appear, there has been very little alteration in its features, except that it has grown more active. At that time also we learn that the slopes of the island were cultivated in places by the natives, the crops being algodón or cotton, and camote or sweet potatoes. The chronicle further relates how the minister of Taal, Padre Fray Tomas de Abreu, with the assistance of 400 Indians, erected upon the summit of the crater a large wooden cross formed of a hard wood named *Anobing* (*Artocarpus*), and that afterwards the fields, which had become quite sterile, returned to their former fertility, and that the volcano was not for a long time known to cause any disaster amongst the inhabitants.

Our author states that he has not been able to meet with any other notices, except those indicated, anterior to the eighteenth century. During this it appears to have been the custom for the parish priests of the neighbouring towns to register in a manner more or less detailed and exact, the principal eruptions of the volcano. Thus, in the "*Relation of that which happened in the volcano of the Laguna of Bombong*," written in Bauan, on the 22nd December, 1754, Padre Fray Francisco Bencuchilo speaks of two eruptions which took place in 1709 and 1715, accompanied by loud subterraneous thunders, and a casting forth of red hot stones, and a great fire, which, like a river, flowed all over the island, destroying everything in its course and yet not causing any damage to the towns situated on the margins of the lake, but limiting its action entirely to the small volcanic island.

This statement, if it be taken to mean that lava streams flowed from the volcano during the eruption, has nothing to confirm it in the island. None of the craters seem to have given rise to anything

of the sort. The Spanish geologist mentions that, in some of the deepest barrancos, doleritic lavas are exposed, which he refers to the most ancient eruptions connected with the volcano. On referring to my notes I can find no appearance of anything of the kind except at Binintiang Malaki, where there is something like a stratum of true basalt, but the vegetation prevented my being able to trace it accurately. This, at any rate, could not have been the lava stream to which the worthy friar refers. It is most probable that the appearances described were due to the slipping down from the slopes of large quantities of red hot ashes. I noticed a similar effect on the sides of the crater of Semiru, in Java, when in full eruption. The whole mountain seemed aglow at night time, as if the point of it was red hot, and every now and then there were slips and refts, avalanches in fact amid the ashes. This, at a distance, gave an appearance of movement exactly like streams of fire.

I find on referring to the article Volcan in the *Diccionario Geografico Estadistico de las islas Filipinas por el P. Buzeta* (which through the kindness of Padre Mauricio Blanco, of the Augustinian Convent, Iloilo, Panay, who obtained a copy for me, I am able to refer to now), that a graphic description is given of an eruption which took place in 1716. It seems to have had its origin about the Punta Caluit on the south-eastern side of the island; at least this is what is said by the recording eye-witness, but a reference to the map will show that this part of the island is quite free from any traces of a crater or other focus of activity. I had a good opportunity of examining this part of the island, as we kept very close to it in our canoe. The eye-witness referred to was Padre Francisco Pingarron, then parish priest of the town of Taal, the main points of whose description are as follows:—

On the 24th of September, 1716, at 6 o'clock in the evening, they suddenly heard loud sounds like discharges of heavy artillery which came from the direction of Manila. Shortly afterwards the fiery glow which comes from the island volcano, seemed to be directed to that portion which was nearest to the town of Lipa, that is the island cape called Calavita, which appeared to be a



mass of fire. Subsequently the fire seemed to involve the lake in the direction of Mt. Macolod, causing an enormous bubbling or jets of water and ashes, which rose continually into the air, causing much fear and terror, especially as this was accompanied at the same time by great earthquakes agitating the water of the lake into high waves such as a hurricane might have produced, which beat against the shore with such force as to remove many fathoms of it, and endanger the safety of the convent. This state of things continued during Thursday, Friday, and Saturday until Sunday, on which day the worthy Father says—all the material of nitre, sulphur, &c., which occasioned the fire was pretty nearly consumed. The waters had meanwhile become quite hot, destroying immense numbers of fishes both large and small. These were cast upon the shore by the waves, and, with the odor of sulphur, created such a terrific effluvium that the inhabitants of the neighbouring town were threatened with a pestilence. When the sun came out for a few moments on the Sunday, it was seen that the waters of the lake were as black as if they had been dyed, which caused the greatest terror; but, to use the words of the pious chronicler, "it pleased God in His infinite mercy to restore tranquillity to the elements, and all that remained was the oppressive odor of so many dead fish."

In 1731, says Padre Benenchillo,\* the effects of volcanic activity made themselves once more manifest in the lake, and the result was such an agitation of the waters and a casting up of mud, sand, and ashes from the bottom, that some islands were formed, and these are thought to be those of Bubung and Napayong. At least Señor Centeno thinks so, but the Augustinian monk says that the formation took place opposite Punto Calavita, where, as already stated, there are no traces of local volcanic action, and where the lake is of great depth.

---

\* *Relacion de lo sucedido en el volcan de la Laguna de Bimlang, y en la Bataan en 24 de Diciembre de 1734.* I must mention that I am greatly indebted for this reference and quotation to Señor Centeno's pamphlet. I have never seen the work myself, which, however, is cited by most of the subsequent writers on the topography of the Philippines.

It would seem as if these volcanic disturbances at the bottom of the lake must belong to some subaqueous crater. The locality of them is in a prolongation of the line of fissure which extends from Binintiang Munti through the main crater by Mt. Pinag Ulbuan to these islands. From the repeated disturbance of this part of the lake we may reasonably infer that this is one of the main foci of volcanic activity, and is in fact a point corresponding with what must have been the highest centre of the ancient and submerged crater. The present crater is considerably to the westward of this point, and probably is quite insignificant in comparison with the old volcanic vent. The excessive discharge from this centre is probably the explanation of why it has subsided the deepest. The fires may now be diverted entirely to another channel, as so long a period has elapsed since there has been any renewal of the disturbance in that direction.

From 1731 there were 18 years of comparative quiet; but in 1749 there took place one of the most severe eruptions of which there is any record since the arrival of the Spaniards in the Philippines. At that date the parish priest of a neighbouring town was Padre Bencuchillo, "a man of observation and fond of these kind of studies," who took care to witness as much as he could of this eruption, and of the greater one in 1754, and wrote a detailed account of what took place.

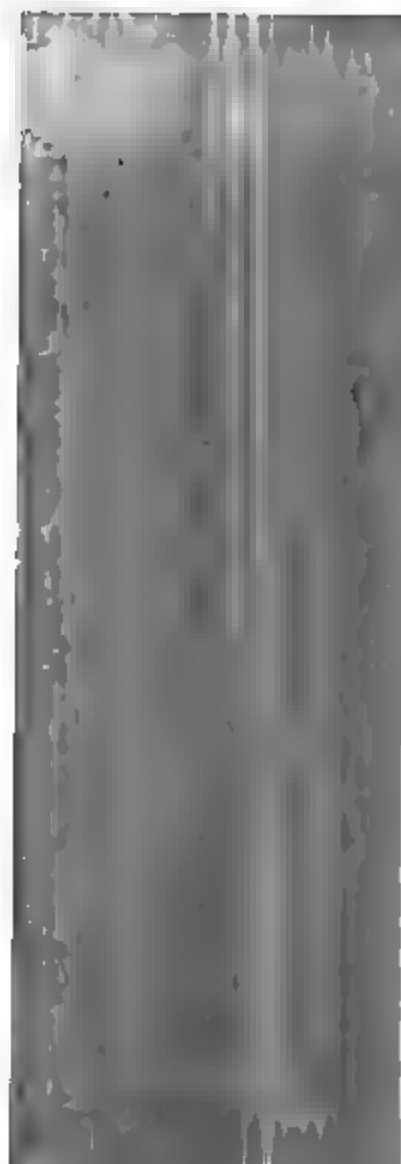
At 11 o'clock at night, on the 11th of August, 1749, the first indication of the eruption was a brilliant glow over the summit of the volcano. This was followed at three in the morning by continued detonations, which lasted until dawn. An immense column of smoke began to roll forth from the crater, with hundreds of other little pillars from different parts of the island. From the surface of the water of the lake there rose what the chronicler describes in this and other places as perfect obelisks of sand and mud, which, he states, reached certainly above the clouds, and then spread out and fell back into the water. These jets, which came forth from the depths of the lake, appeared in two principal directions, one to the north and the other to the east of the volcano. At nine in the morning violent earthquakes commenced, and as the



appalling jets of water and sand into the heavens began to come closer and closer to the shores, the inhabitants fled into the hills. After a second series of earthquakes a large portion of land near the town of Sala was submerged beneath the lake, leaving nothing visible but the tops of the trees. The force of the eruption continued with all its primitive violence for three days, during which time the air was so darkened by ashes that the lamps had to be lit by day in the houses. After the third day there was a mitigation of the force of the eruption, which, however, continued unusually active for three weeks, and then the crater was comparatively quiet for a while, but the volumes of smoke which came forth from it were dense and unusual, and remained so for the succeeding five years.

Until 1751, the year of the great earthquake of Grand Cairo, when half the houses and 40,000 people are said to have been swallowed up, Taal remained quiet, but on the 13th of May of that year it broke out again. This was the greatest eruption that was ever known there. For seven months, or rather until the 1st

only by the quantity of cinders, but by the heat of the fiery rain. This was followed in the month of June by showers of black mud, together with the ashes, while night was made horrible by the fearful sounds, or the kind of infernal glow of fire, flame, and volumes of sulphurous smoke. The observer who gives the account of it, kept his ground in the town of Taal, though the greater portion of the inhabitants had fled. All the months of July, August, and part of September the volcano continued to emit, with more or less intensity and slight intermissions, great flames with dense volumes of smoke. On the 25th and 26th of September the shower of ashes was so heavy that the few remaining inhabitants had to leave the houses, lest they should be crushed by the falling roofs. From the same cause everything in the way of vegetation was utterly destroyed. The whole of the months of October and November were occupied by new manifestations of fiery activity, with an increase of the deafening roar. On the feast of All Saints, the first of November, there was a marked increase of the disturbances, but on the 27th the fury seemed at its height. New fiery mouths were opening out at every moment, until the island seemed to be one mass of flames, which appeared to penetrate the clouds. The earthquakes and the explosions were really terrific, and the fiery and muddy rain was becoming of such increasing danger that the Padre and the last remaining inhabitants took refuge in the mountains, which they only succeeding in reaching after incurring innumerable perils. The 28th of November was another awful day, and on the morning of the 29th they perceived new jets of vapour in various parts of the island between Point Calavita and the crater in a straight line, as if a new fissure had been opened between those two points. The Alcalde and the Padre, who had returned to Taal to contemplate the ruins which were there, had to fly again to the mountains, for the last great effort of the eruption had begun. At four o'clock in the afternoon the horizon began to be hidden by utter darkness from a steady rain of mud, ashes and sand, not in great quantities at first, but unceasingly through the whole of the night, so that in the morning there was on the ground and on the houses nearly half-a-foot of the results



this of the destruction or palpable darkness described the Padre saying that all could ever behold, all were toiled unceasingly to free lest they should be buried eating or sleeping, but on darkness so that they might yet prisoners, for no fetters this thick obscurity. The visible, and thus in the morning. At four o'clock in the afternoon and at four leagues from the coast it was found to have occurred while in places nearer to the coast.

On the 1st of December the eruption ceased ; but, to fill up the time on the next day a terrible eruption in waste and in ruins all the country.

To this awful eruption most of very slight distance have just related, in the another manifestation of the volcano until the month of April.

On the 17th of May, 1874, there took place an eruption of black mud and cinders, unaccompanied by earthquakes either before or after. On the 19th of July of the same year, there was another eruption with dense sulphurous fumes, the characteristic odour of which was inconveniently felt by the inhabitants of Talisay.

On the 24th of June, 1877, earthquakes were felt from one to half-past six in the morning, but they were not followed by any eruption.

From the last days of October, 1878, to the 12th of November, subterranean noises were frequently heard proceeding from the volcano. On the date mentioned there was an eruption which lasted until the 15th, and covered all the island with a thin coating of ashes, but without any earthquakes either before or after.

On the 8th of June, 1880, greater activity than ordinary was observed in the volcano. For some nights there was a bright glow over the crater, which continued with slight interruption until the middle of July. On the 17th, 18th, 19th, 20th, and 22nd, subterranean noises were heard, and from time to time a small globe of fire was thrown up out of the crater, which burst at a certain height above it.

Finally there was an eruption in 1885, to which I have referred. About the month of September, volcanic disturbance commenced and continued for some months; great damage was done by the fall of ashes, and all the cattle on the island were destroyed. I visited the neighbourhood, and found a most complete scene of desolation in place of the fertility which had formerly reigned. The inhabitants had been so alarmed that they had fled in considerable numbers from Talisay and the villages on the margin of the lake, but there was no loss of life. On some future occasion I hope to give further details about this eruption, but at present some promised data and details from Spanish eyewitnesses have not come to hand.

In conclusion a few words may be said about the peculiarities of this volcano. Owing to the absence of any well-exposed lava streams there is no means of ascertaining whether this crater gives effective support to the views enunciated by Baron Richthofen.



Richthofen suggests that :  
he gives the name of "p  
before the andesites, and i  
that in many instances pr  
But the propylites are, in  
andesites, and, like them,  
occurs, and others in wl  
microscopic characters the  
dacites only in the fact th  
line in structure, being ind  
from the diorites or the p  
The propylites also contai  
dacites as a rule do not,  
Szabo well points out, are  
sulphurous and other ve  
frequently contain valuab  
andesitic lavas is sometim  
or followed, by eruptions  
intermediate composition  
from that prevailing in th  
eruptive action in most v  
belong to the classes of th  
basic lavas.\*

The author from which

radiating lines of fissure are composed of andesite and trachyte. All the recent ejections of the volcanoes have consisted of rhyolite or basalt.

As I have said there are no proper lava streams from which this can be studied. The Spanish geologist considers that in the lowest formation or the basal foundation of the island, there are true lava streams of a basaltic character. This would mean that the earlier eruptions, or rather those which built up the island after the subsidence of the great crater, were accompanied by outflows of lava. From this point of view the whole history of the present crater is very difficult to unravel, but without entering into the matter it may be sufficient to say that what evidence this volcano offers, though it is but slight, is in favour of Richthofen's theory. The general character of all the emanations is basaltic and doleritic. Trachyte is, however, found in a few places, as for instance the island of Napayong, and about Mount Sungay in a barranco close to the town of Talisay. I shall subjoin to this essay the list given by Señor Centeno of the minerals which he has met with, premising that I have not been able in every case to verify the references, or visit the localities. I may mention also that there is a trachytic rock visible at Binintiang Malaki, but no rhyolites, andesites or propylites as far as I have been able to make out.

CATALOGUE OF THE ROCKS OF THE VOLCANO OF TAAL AND OF  
THE MOUNTAINS IN THE VICINITY OF THE LAGUNA OF  
BOMBON.\*

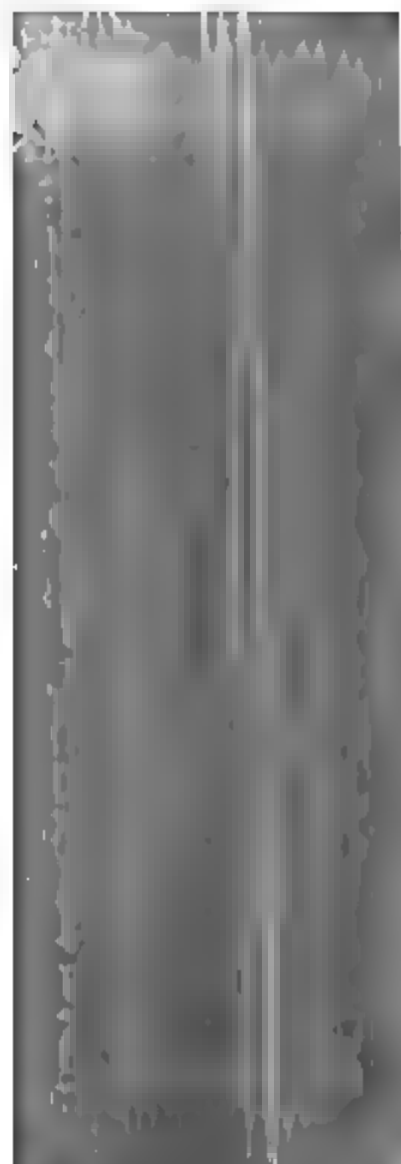
1. Sulphur crystallized and in concretions. Volcano of Taal, bottom of the crater on the north-east border of the yellow lake.

2, 3, 4. Crystals of gypsum surrounded by a nucleus, probably vegetable, which has disappeared and has been replaced by sulphur. The specimens also contain alum. Ditto.

5. Crystals of gypsum. Ditto.

---

\*In the following list the numbers up to 74 are from the district of the town of Talisay, 75 from Lipa, 76 to 79 from Cuenca, and 80 from Taal.



10. Basalt, somewhat
11. Wacke, (earthy & pitchstone are observable)
12. Spongy basaltic &
13. Basalt. Ditto.
14. Volcanic breccia.
15. Basaltic lava. D
16. Volcanic tufa. I
17. Ditto. Central v west.
18. Ditto. Localities tiang Malaki.
19. Basalt covered with thin layer of the rock. Pina
20. Superficial crust of the highest portion of t
21. Ditto. Interior
22. Dolerite with malakite and Binintiang Malaki.
23. Scorise. Volcanic
24. Mimosite (?). V of the crater.

26. Lapilli. Volcano and Binintiang Malaki.
27. Conglomerate of sand and ashes, with a nucleus of dolerite. Volcano, Binintiang Malaki, wall of the crater.
28. Trachytic Breccia. Volcano, Binintiang Malaki at the base.
29. Laterite. Volcano, Binintiang Malaki. Point Baclas.
30. Tufa with red ochre. Volcano and Binintiang Malaki in the crater.
31. Wacke and laterite. Ditto.
32. Volcanic conglomerate of recent ashes. Ditto.
33. Volcanic grits. Volcano, Binintiang Munti, western slope top of an escarpment.
34. Volcanic tufa. Volcano, Binintiang Munti, western slope.
35. Doleritic lava, somewhat scoriaceous. Volcano, Binintiang Munti, eastern slopes.
36. Trachy-dolerite. Ditto.
37. Doleritic lava. Ditto.
38. Basaltic lava. Volcano between Mapulang-Bato and Binintiang Munti.
39. Dolerite. Ditto.
40. Doleritic lava. Ditto.
41. Doleritic lava, reddened by magnetic iron. Volcano, Mapulang-Bato.
42. Basaltic lava. Ditto.
43. Basaltic scorïæ. Between Point Calavita and Mapulang-Bato.
44. Doleritic lava with magnetic iron. Ditto.
45. Basaltic lava. Volcano between Point Catan-catangan and Point Calavita.
46. Scoriaceous basalt. Ditto.
47. Doleritic lava, largely porous and scoriaceous. Ditto.
48. Doleritic lava, ditto and at Point Catan-catangan itself.
49. Basalt. Volcano on the borders of the great crater.
50. Tufa composed of fine constituents. Escarpment of Point Baloc-baloc (close to Pinag Ulbuan).





57. Doleritic lava.  
Ragatan about the margin
58. Scoriaceous tufa of  
of the volcano.
59. Volcanic tufa. D
60. Compact bed of sc  
of the island Bubiun.
61. Volcanic tufa. B
62. Basalt. Ditto.
63. Basalt somewhat s
64. Basalt. Napayon
65. Trachyte with str
66. Laterite. Ditto.
67. Very compact volc
68. Trachy-dolerite.
69. Compact volcanic
70. Retinite. Mount
71. Trachyte. Ditto.
72. Porphyritic trachy
73. Laterite. Mount  
Baliobiring.

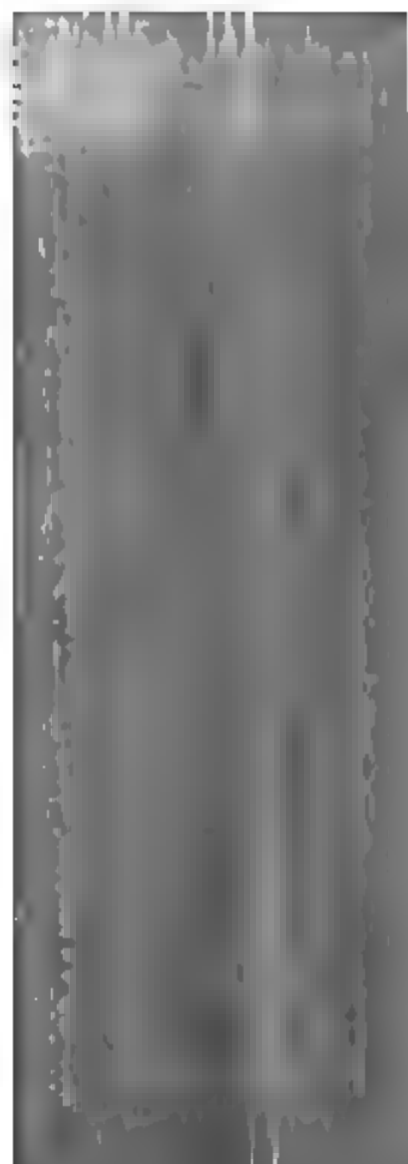
- 76. Doleritic wacke. Ditto, Sabang barranco, upper part.
- 77. Volcanic tufa. Ditto.
- 78. Compact doleritic lava. Ditto.
- 79. Ditto, coarsely vesicular. Ditto.
- 80. Trachy-dolerite. Calangay Village on the left bank of the river Pansipit.

#### CATALOGUE OF PLANTS ON THE VOLCANIC ISLAND OF TAAL.

During my stay upon the island and crossing the Laguna of Bombon, I made a collection of more than 100 plants, which was augmented through the kindness of friends who had collected in the same locality, to more than 230 species. Señor Centeno has published at the end of his pamphlet a list of 236 species which were collected on the island between 1877 and 1879. They were determined by Padre Fray Celestino Fernandez Villar, an Augustinian monk, who, with Padre Andrea Naves, edited the new and magnificent edition of Padre Immanuel Blanco's "Flora Philippinensium." I find, on comparing my list with that of Señor Centeno, that it includes many species overlooked by his collectors, while I did not succeed in obtaining some that are mentioned in his list. I shall therefore combine the two, and shall add such remarks concerning the various species as will include some of the botanical notes during my eastern travels.

#### RANUNCULACEÆ.

1. *NARAVELIA ZEYLANICA*, DC., called Banai-banai by the Tagalo Indians. This is an inconspicuous climbing plant with star-like yellow flowers distinguished from *Clematis* by the presence of petals. It is the only species, and extends all through the Eastern Archipelago, being known by the name of *Narawael* in Ceylon. I have found it in shady humid places in many localities where I have been botanizing in Java, Malayan Peninsula, &c. The plant is acrid, but I am not aware whether any medicinal properties are attributed to it by the natives.



leaves are used (as also r  
for sandpaper. The Vis  
Mala Catmon, Mala sign  
species of *Dillenia*, which,  
the Indians. This specie  
included by the older aut  
to the genus *Dolioscarpus*  
delimo, to file off, and :  
corosa to smooth.

M

3. *MICHELIA CHAMPAC*  
famed for the perfume of  
their heads, the scent and  
a contrast with their black  
East, where in India, th  
universally known by the  
from an island off Camb  
the tree is a native. It i  
as in India, and for the s  
is called Yeung-kau-nga,  
Kinkoboku. I am doubl  
volcano island; but, in a s  
from the Barrios or villag

Atis, which are those of the same plant in Asia, and which belong to eastern languages. From this St. Hilaire infers that the Portuguese transported this plant from their Indian to their American possessions. It has been a matter of much controversy, whether the custard-apple is of Asiatic or American origin. Several claims have been put forward for different parts of Asia, even including the Philippine Islands, where it certainly has been cultivated from the earliest European colonization. The whole question can be seen in De Candolle's "Origin of Cultivated Plants," and it can hardly be doubted that the fruit originated from America, and, probably, the West Indian Islands, but there are no other true *Anonas* indigenous to Asia, though there are some in Africa. In connection with this fact, a rule which it is well to bear in mind, is mentioned by De Candolle, namely, that no tree, *except littoral species*, is known to be indigenous at once to tropical Asia, Africa, and America.

5. *ANONA MURICATA*, L. Sour Sop, Custard Apple. There is no controversy about the introduction of this species, which is the largest and, by many, considered the best. It is much valued for flavoring ices.

6. *ANONA RETICULATA*, L. This is the species named custard-apple in the West Indies, while all through the East it goes by the name of Bullock's Heart. Where proper attention is not paid to its cultivation it is small, tasteless and gritty, especially in Java. The finest fruit I have seen is at Malacca. The chirimoya is not, strange to say, cultivated in the East.

7. *UVARIA PURPUREA*, Blume. Banuac, in Tagalo and Visayan, also Susong-calabao, the second name referring to cow's milk. This beautiful purple flower with clusters of yellow fruits (edible?) like plums, is very commonly met with in the jungle throughout the Indian Archipelago.

#### MENISPERMACEÆ.

8. *TINOSPORA CRISPA*, Myers. Macabuhay, Tagalo, which, I am informed, is equivalent to *revivifying* or *resurrection*. This climbing shrub is found throughout India and the Archipelago, and known



Flückiger and Hanbury,  
examination of this plant.

9. *ANAMIRTA COCCULUS*, V  
Visayan; Andorualli, Bali  
as *Cocculus indicus*, used to  
for intoxicating fishes. Th  
Malays. The poisonous pri  
pericarp is found the no les  
I have met the species occa  
Malayan and Philippine Ar

10. *CISSAMPELOS PARAIR*.  
Visayan; Aroai-Astravulu,  
wide-spread plant found in  
climbing character of ivy (  
the vine (*αμπελος*); called by  
doubtful whether this is not  
guese missionaries in the  
acquainted with a root to  
attributed, and which was n  
brought to Lisbon, and then  
ambassador of Louis XIV.  
have been confused with thi

## CAPPARIDEÆ.

11. *GYNANDROPSIS PENTAPHYLLA*, DC. Although Vidal's list of native names is very rich, comprising more than 1600 words, yet this plant does not appear to be represented in it. In Bali it is called Boangit. The genus has been united with *Cleome*. It was separated for this species and similar ones in consequence of a greater elongation of the receptacle, which becomes extended into a long and slender stalk. There is nothing otherwise calling for notice in the species, except that it is a tropical coast plant of India, Africa, and Asia. I have found it also in Celebes. There is a species in North Australia distinguished by the very large size of its flowers.

12. *POLANISIA VISCOSA*, L. This plant is widely spread as a weed throughout the whole of the East, but especially in the Philippines, where in some places it goes by the Visayan-Indian name of Namoc or the mosquito; in Bali it is also called Boangit, and the leaves are eaten like mustard leaves in salad. In all Northern Australia the plant has become a perfect nuisance, and goes by the inelegant name of 'Stinking Roger.' It is common as a weed in Celebes, Amboyna, and Timor.

13. *CRATÆVA NURVALA*, Forster. Balainamoc in Tagalo. A widespread plant extending from Malabar to the Society Islands, where it is regarded as a sacred tree, and planted in the gardens. In Java it is called Dangdur-Allas. In the East it is called the Sacred Garlic Pear, and is a small tree. I am doubtful whether this came from the volcanic island.

14. *CAPPARIS HORRIDA*, L. f. Native names Dauag, Alcaparras. The latter name is doubtless a corruption of Capparis. A white-flowered shrub with spinose stipules; widely spread throughout the East.

15. *CAPPARIS MICRANTHA*, Blume. No special name to distinguish this species which is spinose, but with small leaves, and generally a smaller plant. I have met with it in Sumatra and Java.



the time of the discovery of it  
to stain their bodies red, and  
Mexican name Achiotl is the  
plant is highly valued at the  
forms an agreeable condiment  
in chocolate and pillaws of r  
It is valued also medicinally.  
qualities. On certain occasions  
lemon juice, to dye the skin.  
bright orange. The bark of t  
is used for a common sort of r  
makes it a favourite material  
juice is said likewise to be at  
the root "Manihot or Cassav  
from the red pulp covering  
macerated in a wooden vessel  
the red pulp. By diligent sti  
from the seeds, or gradually w  
seeds are clean they are taken  
the water is poured off and t  
to dry slowly in the shade I  
dry in an airy place till it is  
fruit with wooden pestles; th  
This liquor is passed through

17. *FLACOURTIA SEPIARIA*, Roxb. In Tagalo Bitongol ; in Sundanese Seradan-caju, the latter name meaning wood in Malay. In Telegu it is called Canru, or at least the fruit which is sold in the market. This is a red berry, dreadfully astringent when fresh gathered, but by keeping it acquires a pleasant acidulous flavour. It is thorny, and, therefore, used throughout the East as a hedge plant.

#### POLYGALACEÆ.

18. *SALOMONIA OBLONGIFOLIA*, DC. A little insignificant weed which does not appear to have any native name in the Philippines, though the natives of Banka call it Jereme-auju. It is found in moist places in the warmer districts of India, from Ceylon and the Malay Peninsula to the Philippine Islands and Hongkong. I found it growing very thickly all over the European Cemetery in Labuan, Borneo. Its terminal spikes of minute pink flowers make it look like a heath.

#### PORTULACACEÆ.

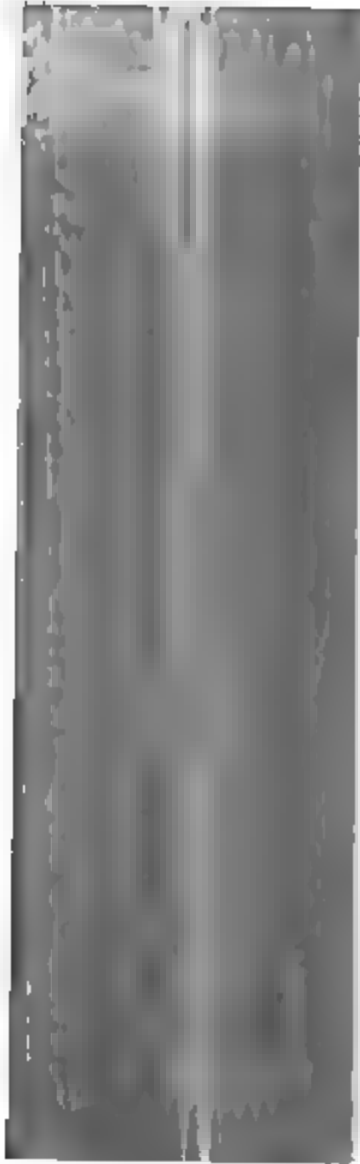
19. *PORTULACA OLERACEA*, L. The common purslane, which is naturalized in all the warm countries of the world. It does not appear to have any vernacular name in Luzon, unless that of Bonglay, which means a weed. In Sundanese and Javanese it is called Gelang. I never noticed that it was much eaten by the natives. It has acquired a melancholy interest from its being used so much by the lamented Australian explorers Burke and Wills as a means to stave off famine.

20. *PORTULACA QUADRIFIDA*, L.

#### MALVACEÆ.

21. *MALVASTRUM TRICUSPIDATUM*, A. Gray, in Botany of American Exploring Expedition. This species of American origin is dispersed as a weed over all the tropical Asiatic regions. Its small orange flowers in waste abandoned places, remind one of the habits of the marsh mallow, the place of which it takes in habits and medicinal virtues.





for the frames of boats. It is a brown seed-vessel. It is also Altogether it is a valuable tree. The tree however has to be a green and red ant.

23. *SIDA HUMILIS*, Willd. Mamolis, also Escobang. The which are common oriental tree waste places.

24. *SIDA RHOMBIFOLIA*, L. generally known in Australia such a troublesome weed. It is but there is no question that it is East as well. The Acclimatist introduced this pest, but it was ment of the colonies.

25. *SIDA CARPINIFOLIA*, L. of the Mauritius.

26. *ABUTILON INDICUM*, G. Malay. As in the case of many native Philippine name for the sides and waste places in all S this is most common in the

28. *URENA LOBATA*, L. A weed so widely spread throughout the East and as far as tropical Australia, that its pretty pink flowers form a considerable portion of the undergrowth of every jungle. Very variable in the shape of its leaves. It is called *Latiang* in Malay.

29. *HIBISCUS SURATTENSIS*, L. Assam-tusur, Malay; Antolangan, Tagalo. A very prickly, wide-spread, straggling weed, which is probably indigenous; with yellow flowers and a dark purple centre. Leaves eaten for their pleasantly acid taste.

30. *HIBISCUS TILIACEUS*, L. A common small sea-coast tree of most tropical countries including Australia, particularly abundant in the islands of the Pacific. Flowers large and showy, yellow, with a dark crimson centre. In the Philippines the flowers are much esteemed for their medicinal virtues. At Amboyna it is called *Haru*.

31. *HIBISCUS ROSA-SINENSIS*, L. A plant in cultivation in almost every garden throughout the Philippines. Probably this is the species to which the Tagalo name Antolangan is given, but it is also called *Mapola*. The flowers are used for every purpose of adornment, to polish leather, and also, strange to say, by the women to blacken their hair and eyebrows. The Chinese call it *Hung fa*, using it on all festive occasions, particularly at funerals, where it is made into garlands to adorn the feast. The Japanese name is *Bussonge*.

32. *HIBISCUS ESCULENTUS*, L. Gumamela in Tagalo. I am doubtful as to the habitat of this species, which is used so extensively in all the East, where it goes by the name of Gombo or Okro, but is not common as a vegetable in the Philippines. The young fruits of this annual are the most delicious of tropical vegetables, and their mucilage forms a useful thickening for soups. Where it originally came from has been disputed. It was claimed as belonging to the Eastern flora, but there are no ancient names for it, and no indication of an ancient cultivation in Asia. De Candolle, on the authority of Flückiger and Hanbury, quotes from an Arabic work showing that it was cultivated under the name of Gombo by the Egyptians in 1216. It came probably from more southerly African regions.

Parlatore,\* and the other b, well-known species, and tw four, only two of which are which originated in culture *G. herbaceum* is the species *G. indicum* in China and doubtful. The natives of depend upon it as one of th

## STE

34. STERCULIA FOETIDA, L  
Java Dangur-jedeh. This the East Indian and Mala pelago, and extending to At wherever the plant is bruise Flying Fish were out ma when clearing their station carpels are like three figs joi these were seen abundantly The oily seeds bring on nau aperient, diaphoretic, and d excellent fibre, and exudes

the Indian Archipelago, the Moluccas and the Philippines. It has broad leaves and divaricate racemes of small pink flowers. When bruised or cut it emits a strong odor of violets, which the father of Dutch Naturalists, Rumphius, refers to in his work on Amboyna.

36. *MELOCHIA CORCHORIFOLIA*, Willd. Balitnon, Visayan; Pompuruten, Javanese and Sundanese. A weed which I have not seen very commonly in the East.

37. *WALTHERIA AMERICANA*, L. The species are mostly American, but this one, which is found in Australia, is very generally dispersed within or near the tropics all over the world.

38. *HERITIERA LITTORALIS*, Ait. Commonly called the looking-glass tree. Dungon, Tagalo, Atun-laut, Malay; Penglai-kana-so, Burmah. A large evergreen tree, common in all the tidal forests along the sea-shore from the Indian Peninsula to Australia. Wood brown, rather light and loose-grained, probably not occurring on the volcano island.

#### TILIACEÆ.

39. *TRIUMFETTA PROCUMBENS*, Forst. An insignificant weed found in most islands of the Indian Archipelago and the Pacific within the tropics. The Malays in Java call one species Gut-jingam.

40. *CORCHORIS OLITORIUS*, L. Visayan, Pasao (pigs' food); Japon, Javanese; Isunaso, and Kanabikio (rope, cable), Japanese. The valuable Jute of commerce, indigenous to India, but now cultivated and naturalized in all the East, including the Philippines. The fibre of this plant is the most widely distributed production of India. There is not a town in Europe in which jute is not found in the form of ropes, lines, string, bags and paper. The fibre is derived from two species, *C. capsularis* which furnishes the sunn-hemp of commerce, and *C. olitorius* the fibres of which are employed to make the coarse stuff known as gunny or goni, the native name for the fibre on the Coromandel coast. This

species in Bengali is called Blunjee-pat; the other Ghastia-pat, and a wild variety called Bun-pat. The plant is cultivated in the Philippines. It is prepared by maceration in water and sun-dried. The trade is very considerable in India. Besides gunny-bags made from the bark, the stems are used for charcoal, gunpowder, fence, basket work, and fuel. It is now also employed in the manufacture of cheap carpets, bags, sacks, and, mixed with cotton, forms cheap broadcloths. It is even mixed with silk, and from its lustre can scarcely be detected. No article is so universally diffused over the world as the Indian gunny-bag. It is sent from Calcutta to Penang, Singapore, Sumatra, Java, and the whole of the Indian Archipelago for packing pepper, coffee, sugar and vegetables. Jute gives employment to hundreds of thousands in India. Every Hindoo passes his leisure moments, distaff in hand, spinning gunny twist, and in this way an important industry and means of livelihood is placed within the reach of all. It is calculated that the quantity of Jute fibre produced in India is not far short of 500,000 tons annually. Rauwolf says this plant is used about Alexandria by the Jews who beat the leaves to get with great labour

**CELASTRACEÆ.**

44. *GYMNOSPORA MONTANA*, Wight et Arn. A tall shrub or small tree common in the Indian Peninsula and probably in Africa. I have met with it in Perak and in the Moluccas, and it extends to Australia.

**RHAMNACEÆ.**

45. *GOUANIA LEPTOSTACHYA*, DC. A climbing weed diffused through the East, of no interest except that one species of the same genus produces the "chaw-stick" of Jamaica.

**AMPELIDEÆ.**

46. *VITIS TRIFOLIA*, Wallich. Alangingi, Alupidan, Visayan ; Aroai Landuk, Sundanese (all climbing plants are called Aroai in Sundanese). The whole of the jungles in the East are bound together by various species of vines, all of which produce a fruit of some kind, but none having the smallest pretensions to utility. The species here enumerated is very common in East India and the Archipelago, and has a whole host of synonyms. It extends to Australia.

47. *VITIS LANCEOLARIA*, Wallich. Burmese, Kyee-Nee-Nway. Common in the tropical forests especially in rocky places. From Tannasserim to the Andaman Islands, through Burmah, Malaysia, the Archipelago to the Philippines.

48. *VITIS CAPRIOLATA*, Don.

49. *VITIS PEDATA*, Vahl.

50. *LEEA SAMBUCINA*, Willd. This is another common tree or shrub, coarse in appearance with conspicuous reddish aspect, very common about Perak. It extends to Australia.

## SAPINDACEÆ.

51. *SCHMIDELIA COBBE*, L. An unimportant shrub distributed through tropical Asia and the Indian Archipelago, and extending to Australia. The characters of the plant are very variable, so that two or three species and another genus (*Allophylus*) have been made out of the varieties of the one named. The berries are said to be very poisonous, which earned for the tree the name *Toxicodendron*, yet the root is astringent and employed by the native physicians for diarrhoea.

52. *CAPURA PINNATA*, Blanco, in Pampanga called *Talinouua*.

53. *CARDIOSPERMUM HALICACABUM*, L. This straggling climbing annual with its heart-shaped bladder-like capsule, is common to most tropical regions both east and west, migrating originally from America. It is a peculiar plant, as common about the ruins of Malacca as it is in some scrubs of Queensland.

the floor of one of the large rooms had a great heap of these nuts piled up at the time of my visit in the month of April. They had been roasted and dried, and in that state were exactly like earth nuts in taste. The artificial chocolate made from them is not at all unpalatable. It consists usually of equal parts of cocoa-nibs, casoi, and pea-nuts.

55. *SEMECARPUS ANACARDIUM*, L. The fruits of these trees are, like miniature Cashew nuts, attached to the thick succulent pear-shaped base of the calyx. The species is widely distributed over East India and the Archipelago, extending to Australia. I believe the natives eat the fruit, which is yellow, smooth, and nearly as large as the nut itself.

56. *SEMECARPUS ALBESCENS*, Kurr, or *S. Philippinensis*, Engl.

57. *SPONDIAS DULCIS*, Forster. Ciruelas, the Tagalo rendering of the Spanish name for plum. The Tahiti apple or hog-plum introduced from the Pacific Islands. It is like a large plum, of the color of an apple, containing a stone covered with long hooked bristles. The flavour is said to be like that of the pine-apple. It is has only lately come into cultivation in the Philippines.

58. *MANGIFERA INDICA*, L. Manga in the Philippines generally and also in Malay; in Javanese Ambe. A native of the south of Asia or the Malay Archipelago. It has a number of ancient common names, and a Sanscrit name which is Amra; Ambe in Ceylon, whence the Persian and Arab Amb. It is now cultivated in all tropical countries. Different authors give very diverse opinions as to where the best mangoes are produced. I can only record what has been my experience, since, in matters of taste, opinions are so divergent. I have never seen any fruit surpassing the mangoes of the Philippines and of Java. Large numbers are annually exported from Manila to Hong Kong. There is a small fragrant kind grown in China called Mung-ko, but Mang-ko is the Mandarin word for the fruit, and Mong-kwo in Punti. The mangoes in the Malay Peninsula are generally of the poorest description.



## MORINGACEÆ.

59. MORINGA PTERYGOSPERMA, Gaertn. Marungay and Calmugay, Tagalo; Kelor, Malay. This is the well-known horse-radish tree; cultivated throughout the East, including the Philippine Islands. The flowers, foliage and fruit are eaten by the natives, and the rasped root employed as a substitute for horse-radish. From the seeds is expressed the oil of Ben so highly esteemed by watchmakers, and not becoming rancid by age. It is perfectly insipid and inodorous, and used for extracting the fragrantcy of jasmine, orange, *Acacia farnesiana*, &c. The cultivation of this tree dates from considerable antiquity, and its medicinal virtues are equally esteemed by all the Malay races. Rumphius and Horsfield have celebrated its virtues, the former more than two centuries ago. From it was derived the *lignum nephriticum*, a drug much used in renal diseases. The ripe seeds and the unripe seeds known in Europe as Nux Behan, are also sold as a drug. The

from the Latin Indicum, which denoted the country from which the Romans obtained it. Roxburgh says, "Native place unknown, for though it is now common in a wild state in most of the provinces of India, it is seldom found far from the districts where it is now cultivated or has been cultivated formerly. The indigo of the Philippines is generally highly esteemed as of a superior quality. The dye is derived from three species which are grown very profitably in the provinces of Pampanga, Bataan, Laguna, Tayabas and Camarines."

64. *INDIGOFERA GALEGOIDES*, DC.

65. *GLIBICIDIA MACULATA*, B. & H. Maricacao, which name is a corruption of the Spanish Madre de Cacao. This is an American plant which has been introduced into the Philippines as a kind of protection for the young cocoa trees, whence it is called "Mother of Cocoa." I have never been able to ascertain what particular benefit was supposed to be imparted to the young cocoa by its proximity, but certain it is that they are never seen apart in the gardens or in the fields, and the natives do not seem ever to plant one without the other. The plant has showy lilac flowers like *Wistaria*, and its clustered blossoms are seen in all the native gardens around Manila, and indeed through all the islands.

66. *SESBANIA ÆGYPTIACA*, Pers. Jaijanti, Malay. This genus is widely spread over the tropical regions of New and Old World, and the species named is a common weed in tropical Asia and Africa, and, as well as the following, extends to Australia.

67. *SESBANIA ACULEATA*, Pers.

68. *ZORNIA DIPHYLLA*, Pers. This species, which is common in the tropics of the whole world, is so abundant on the slopes of the crater, that it almost takes the place of grass. It is quite an insignificant little weed.

69. *DESMODIUM GANGETICUM*, DC. Docot-docot, Tagalo; Kajang gunong, Malay. These pretty little weeds are widely diffused over the tropical regions of both worlds. The three species mentioned here are spread over the East Indies and the Archipelago, and two of them I have met with in South China and Japan.

70. *DESMODIUM PULCHELLUM*, Benth. A weed or under-shrub spread over India from Ceylon and the Peninsula to the Archipelago, and northwards to the Himalayas, South China, the Philippines and Australia.

71. *DESMODIUM POLYCARPUM*, DC. A range like the last species, but extending to the Pacific islands as well as Australia.

72. *DESMODIUM PARVIFOLIUM*, DC. Common in the hilly districts of India, from Ceylon and the Peninsula to the Archipelago, and northwards to the Himalayas, the Philippines, South China to Amoi and Japan, where it is called Hime-no-hagi, and *D. podocarpum* Nasubito hagi, or the thief-pea.

73. *DESMODIUM LATIFOLIUM*, DC. This species I have not seen.

74. *MUCUNA GIGANTEA*, DC. Aroai-gurahit Sundanese; in Japanese Hashio-mami, meaning a peculiar kind of bean. A plant well known by the irritating hairs on the pod. They are not barbed, but minute needles, sharp at both ends and twisted in shape, so that any friction rubs them into the skin. It is a rather

**Asia.** It is found also in Australia from New South Wales to Western Australia, in fact everywhere except on the south coast.

77. *CANAVALIA ENSIFORMIS*, DC. The leaves, pods and unripe fruits are cooked and eaten with rice, but some of the species are very poisonous.

78. *PHASEOLUS VULGARIS*, L. Kajang-bungi, Leu-tiek, Sundanese; Tau, Punti; Tsam, Mandarine; Japanese, Injen mame, but there are many other names. Several species of this genus have been long cultivated in various countries as beans or kidney-beans, amongst which the above species or common haricot is included. There is much controversy as to the original home of *P. vulgaris*. The whole question can be seen at length in De Candolle's "Origin of Cultivated Plants." Without entering into the matter I may summarize the result of the discussion which is according to DC.:—1. *P. vulgaris* has only been cultivated in India, the south-west of Asia, and Egypt in comparatively modern times. 2. There is no proof that it was known in Europe before the discovery of America. 3. The genus is South American for the most part. 4. Probable specimens have been discovered in ancient Peruvian tombs, while none such exist in the ancient tombs of Egypt, Greece or Rome. There are many cultivated species, three of which extend to Australia, where, like rice and some other domestic plants, they may have been introduced by the Malays, who have visited the north coast annually for trepang fishing for more than a century.

79. *PHASEOLUS TRINERVIUS*, Heyne.

80. *PHASEOLUS CALCARATUS*, Roxburgh.

81. *PACHYRHIZUS ANGULATUS*, Rich. (herb. DC. prod.), Bangkuang, Malay. Cultivated in India, China and Mauritius for the sake of the root, a single, turnip-shaped tuber. It is eaten both raw and cooked, but is not valued much. It is said that the roots are sometimes as thick as a man's thigh, and six or eight feet in length.

82. *FLEMINGIA STROBILIFERA*, R. Br. Hahap-paan, Sundanese. This plant is a familiar object in all the jungles of the East.

while in China, especially about the peninsula opposite Hong Kong, it constitutes a very large portion of the shrubby vegetation in all waste places. It is remarkable for its large brownish bracts, which look like dried hops, and enclose pretty white flowers.

83. *CLITORIA TERNATEA*, L. This climber with its pure blue flowers, though once confined to Ternate, is found in all the jungles and in waste places on the coast in China and Japan. In the latter place it is called the Chio bean. In Malay it is called Bunga-biru. The blue colour is extracted as a dye in many places, and Rumphius tells us that it is used for colouring boiled rice in China.

84. *CASSIA ALATA*, L. Apostola, a native name in the Philippines derived from the Spanish ; also Balayong, Dauan-Kupang, Javanese and Malay. This shrub or small tree is a showy species of the very large genus, and its large leaves and tall spikes of bright yellow flowers are familiar objects in every island of the Archipelago and in the Philippines. In some parts of the Malay

this and other species was exported from the East in thin pipe-like peelings, like cinnamon. Hence the Latin word *Casiæ rufæ fistularem* of Galien, and the *Kassia súryx* of Greek writers. *Syringa* is a name now applied to the lilac, and by some strange perversity commonly applied to the mock orange (*Philadelphus coronarius*). *Cassia fistula* has had a great reputation formerly for the mild laxative qualities of the pulp in which each seed is embedded. The number of authors cited by Hanbury and Flückiger in their treatise on pharmacography, shows how ancient is the use of the drug. See also Vincent "Commerce of the Ancients," Vol. II. 712. The Malay name appears to be Babini.

86. *CASSIA TORA*, L. Native of East Indies, China, Japan and Cochin China.

87. *TAMARINDUS INDICA*, L. This well-known tree hardly needs any special reference, but it may be mentioned that the island of Java owes much of its beauty to the manner in which it has been planted all along the road sides. Thus all the high roads have been converted into cool and shady groves. They are fine trees, and grow straight and stately like pines. I was somewhat surprised to find that the attempt to make similar groves of the roads round Singapore and Penang had partially failed. The few trees that remained had not done well. This was owing to the poorness of the soil in the Malayan regions. The immense richness of the alluvial and volcanic plains of Java can alone produce the stately tamarind trees of that island, which are probably unequalled in the world, reminding one of the gigantic *Cryptomeria* grove lining 20 miles of the road to the Shogun's temple of Nikko in Japan. The Visayan Indians call the tamarind *Oamalaguy*; the Malays *Assam-kirangi*; the Burmese, *Magi-pen*. The wood of the tree is usually fibrous, loose-grained and perishable; but in Java, where the trees are well nourished and old, the heart-wood, though small, resembles ebony in hardness, and is dark-coloured with beautiful dark red veins. The tree yields a white resin which is valuable. The Dutch planted *Pterocarpus indicus* on the road sides in Malacca.

88. *ACACIA FARNESIANA*, Willd. This species is a tree which covers much of the slopes of the volcano, or rather did so cover them at the time of my first visit, for afterwards every vestige of vegetation was burnt away. I was quite astonished at the abundance of this particular kind of plant, and I had never seen anything like it before except in one or two volcanic stony slopes in Java. The tree had a familiar aspect to me also on account of its being not an uncommon bush in tropical Queensland. The species is very common in the tropical countries of the whole world, and is really an ornamental shrub from the curious and large-sized thorns with which it is covered, its pretty orange blossoms, their fragrant perfume so much richer than any other *Acacia* and different in aroma, and its pretty foliage. It is cultivated on the Genoese coast. To perfumers it is a most valuable assistant, possessing a fragrance which is not found elsewhere. It bears some resemblance to the perfume of violets, but much stronger, and is used to fortify that scent which is naturally weak. The yield of flowers is from one to twenty pounds from

91. *PITHECOLOBIUM DULCE*, Willd. Camanchiles, Visayan, Corookoopillay, India. Under the name of *Inga dulcis* this tree has been introduced by the Spaniards from America into the Philippine Islands. All round Manila the sides of the roads are planted with it, and a very poor and straggling tree it becomes under the influence of Manila dust. In Singapore it is used for hedges, and there has quite a different appearance, when washed by the frequent rains of that moist climate. It is cultivated on account of the fleshy sweet pulp which is contained in the twisted red pods. I am not acquainted with the meaning or origin of the word Camanchiles, called also Camansilla. The seeds yield a light-colored oil about the consistence of castor oil. See De Cand. Prod. Vol. 2. p. 436; Roxb. Cor. Tom. I. 99; Willd. Spec. 4, p. 1,000; Sprengel Syst. Veg. 4 in Tom. 3. p. 12; Blanco, Flora de Filipinas, 2nd Edit., Manila, 1845, p. 370. Blanco spells it Camonsiles, identifying the species as *Inga lanceolata*, calling attention to two varieties, one larger with thorns and glabrous pods. He observes that neither corresponds with Sprengel's species, which is pubescent, while these are glabrous with small inconspicuous flowers.

92. *LEUCÆNA GLAUCA*, Benth. Agho, Visayan. This species has become widely diffused through the tropical regions of both worlds, and has become a wild flower in several parts of Asia and Africa. It is thoroughly domesticated in the Philippines; every garden is adorned with its bluish-green pinnate leaves studded with pale yellow or white globular heads of flowers. It also frequently forms thickets along the roadsides in Luzon and Panay. The unripe seeds and leaves are eaten raw with rice in salad, and the ripe seeds are eaten roasted. The Malays call it Kamalang-diengan.

93. *ENTADA SCANDENS*, Benth. Gohong-bacay and Balonos, Visayan dialect; Go-go Tagalo; Aroai-garut-penjang, Sundanese. This large climber is known in Australia as the Queensland bean. Its large seeds are made into match-boxes and other ornaments. It is very common in all the jungles of the East, and the large



seed-pods are conspicuous objects. The seeds are roasted and eaten in Java.

94. *MIMOSA PUDICA*, L. Aroai-reba-bangon, Sundanese. The common sensitive plant has become a terrible weed through the islands of the Indian Archipelago. No one would credit the extent to which it covers the ground, forming tangled thickets of a useless and annoying character throughout the Malay Archipelago. It has only begun to appear in the Philippines.

95. *BAUHINIA*, sp. (?). Amongst my collections there are some *Bauhinia* leaves from the volcanic island. The genus has two or three common representatives in the jungles of the island.

#### COMBRETACEÆ.

96. *TERMINALIA CATAPPA*, L. Talisai, Tagalo and Visayan: Nattoo-Vadom, Hindostani; Catappa, Malay; Adappo, Alfura (dialect of Minahassa, Moluccas); Sanscrit, Ingudi, called by the Spaniards the almond tree, and has been cultivated. The fruit is a nut scarcely two inches long, flattened oval, with a flange around it. The kernel bears but a small proportion to the shell.

98. *QUISQUALIS INDICA*, L. Niog-niogan, Tagalo ; Kaju-bulan or round wood, Malay. This showy red and pink climber with its profusion of flowers is said to be a native of India, but it appears to be far more at home in the Philippine Islands, where its handsome blossoms may be seen on all the roadsides about Luzon. It grows much in the same way about Burmah, where it goes by the name of Da-wai-hmine. *Q. loureiri*, a native of Cochin China, with white and red flowers is used as a vermifuge, and so is *Q. chinensis* which grows about Macao. In the Punti dialect of Chinese, Kap-kwan-tsz ; Mandarine, Kiah-kiun-tsz. In Japanese it is called Shikunshi.

#### MYRTACEÆ.

99. *PSIDIUM GUAVA*, L. See *antea* remarks on the species in the account of the fossil leaves of Taal (p. 723).

100. *EUGENIA* sp. (?) Lumboi, Tagalo ; Macupa Visayan. Whilst at Cuyos group west of the Philippines, I found that the natives subsisted to some extent on the fruits of a *Eugenia*, which grew very commonly in the jungles of the interior of the island. It was about the size of an olive, and of a deep purple colour when ripe. The resident monks informed me that when the monsoon was very severe so that they could not get out on the reefs to fish, and the rains changed the whole of the lower lands into a marsh so as to stop all agriculture, the poorer natives had to abandon their homes and take to the mountains. During this time they had to subsist principally upon lumboi and roots. This food is of a very indifferent kind, and I was assured that there never was a year in which several of the natives did not die of starvation. The species is probably *Eugenia jambolana*, Lamarck. The Anglo-Indian name for the rose-apple, Jambosa, is said to be derived from the Malay word Shambu. I do not know the word for this species. It is called Kepa in Amboyna, in Java, Salam, which is the Malay name for one species. In Sundanese a species is called Ki-sierum-lumbut. Jambu-blimbing is a common Malay name for one species, and Jambu generally for all the Jambosas. The species here referred to extends to Australia, as far south as the Tweed River in New South Wales.

101. *BARRINGTONIA ACUTANGULA*, Gaertn. Boton and Potat in the Philippine dialects; Bangung, Javanese; Puja, Celebes; Balung-bang, Sundanese; Kaju-kendoon, Sundanese and Javanese; Buton-laut, Malay. These splendid trees, with large showy foliage, are seen on all the strands of the Indian Archipelago, and extend to Australia. The large quadrangular fruits strew the beach all along the north-east coast of Australia. It is hardly common in the Philippines. It is said that the seed mixed with bait stupefies the fish like *Cocculus indicus*. The flowers form a ring of crimson stamens, long and drooping, but falling off on the merest touch, in fact even by the heat of the sun, so that after morning the ground near them is strewn with the fallen blossoms.

102. *MELALEUCA LEUCADENDRON*, L. Kaju (wood) puti (white). This species, which is the one from which the Cajeput oil is produced, is very widely and abundantly diffused in the Indian Archipelago and Malayan Peninsula, but is equally widely distributed in Australia down as far as Sydney. The oil is one of the principal articles of commerce at Andaman, but the heat of

a more powerful odour. The difference may arise from keeping it, but doubtless it is much adulterated. This tree is commonly called the tea-tree in Australia, and by a strange perversity some few persons have taken to spelling it Ti-tree, a name which is applied to quite a different plant in the South Sea Islands. Our species is also the paper-bark tree, from the extraordinary tenuity of the layers of bark, which are as thin as the finest tissue paper. All the rivers in North Australia are so densely lined with these trees, and these alone, that it forms impenetrable thickets in most places, and this for hundreds of miles into the interior. The river Katherine, in Arnheim's Land, may be recognised at any portion of its course by the blue thickets of this foliage, which may be seen at long distances. I believe that the tree is the most extensively diffused of all known trees in the Eastern Hemisphere.

### LYTHRARIÆ.

103. *LAGERSTROEMIA FLOS REGINÆ*, Retz. One of the handsomest and most showy flower trees of the East, whose tall spikes of lilac or pink flowers form handsome objects in a great many jungles. It is called Bunga, or *the* flower by way of excellence in Malay, but I think it has some other special name. Amongst the Tagalo and Visayan Indians it is called Banaba. The timber is highly esteemed.

104. *PUNICA GRANATUM*, L. In Visayan, Bomba and Malingin; Sanscrit Darimba, whence probably, says De Candolle, most of the modern Indian names are derived. The domestic use of the fruit is of great antiquity, as the Hebrew name of Rimmon and the Arabic name Rumman testify. It is twice mentioned in the Odyssey, says DC., under the names of Roia, Roa and Sidai. The leaves and flowers of a pomegranate described by Saporta have been discovered fossil in the pliocene strata of France. The above-cited author states that botanical, historical, and philological data agree in showing that the above-mentioned species is a native of Persia. Its cultivation began in prehistoric times, and it early

extended first towards the west and afterwards into China, where it is called Chek-law. It owes its spread not so much to its popularity as a fruit, as to its ornamental character and medicinal virtues. It is seldom seen on the table, and rarely or never in the markets.

105. *SONNERATIA ACIDA*. L. In Tagalo and Vintayan, *Pagat*, in Sundanese and Javanese *Bako*, in Malay *Bakor*, but this applies to a good many mangroves. A species common on all the swamps and salt water marshes throughout the Malay Archipelago. In Western Borneo and the Malay Peninsula it lines the rivers to the exclusion of other trees. The Europeans call it the "Willow tree," which it is not unlike, except that it has a large green apple-like fruit, with the valves of the persistent calyx all round as in popular representations of the sun's flaming rays. It is not uncommon in North Australia.

#### PASSIFLORACEÆ.

country from the earliest times. It is of Indian origin, and its history and spread have quite a literature of their own for which I must refer readers to De Candolle especially, and Asa Gray in the *American Journal of Science*, 1883, p. 370. I just wish to call attention to the fact, that the species is stated in most botanical works to be poisonous, but wherever I have been I have found the natives use it as food but with a little preparation to mitigate its nauseous bitterness. In its crude state it is taken as a purgative. There is no country perhaps where the gourds are so largely used for domestic purposes as in Japan. The long gourd constricted in the middle is the conventional Saki bottle, which the traveller fastens at his waist at the constriction in the middle. Bottles of every size and pattern can be obtained, from those holding only a gill to gourds holding a gallon, a specimen of which I have in my possession. Almost any pattern can be procured. The species grows wild in North Australia where it may have been introduced, but this is only conjecture.

108. *LUFFA ACUTANGULA*, Willd. Malay, Lobat manis, or Petola; Hindoo Jhinga, Torooee; Sundanese, Jingi; Javanese Aroi-kaju-rajam. A much valued vegetable throughout the Archipelago, and is offered largely for sale in all the markets. It is sweet like young peas, and very delicate to some tastes, though Don says it is insipid.

109. *MOMORDICA BALSAMINA*, L. Papare-utan, or jungle cucumber, Malay. This species is widely spread over Asia, Africa, America and Australia. It is a climbing plant with long, fusiform fruits of bright yellow, which, bursting, disclose the seeds enveloped in a brilliantly red pulp. This plant is famous in Syria for curing wounds. Slices of unripe fruit are infused in oil and exposed to the sun until the oil becomes red. It is applied to fresh wounds on cotton.

110. *MOMORDICA COCHINCHINENSIS*, Spreng. Both these species are cultivated but for ornament. In the Philippines the general name for all the family of melons and pumpkins is some form of the Spanish *pepino*. Most of the principal varieties of pumpkins,

such as the Yellow Gourd, the Spanish Gourd, the Turban Gourd, Trumpeter, Squash, &c., are grown in the Philippines. The origin of this plant is still doubtful, and it has been the subject of much learned discussion, for which readers can consult De Candolle, Asa Gray, &c. The vegetable forms a large ingredient in the food of the Malayan and Chinese races.

111. *MELOTHRIA INDICA*, Lourseiro. The so-called common wild bryony of the Indian Archipelago is pretty widely diffused in the Philippines.

#### RUBIACEÆ.

112. *SARCOCEPHALUS NUDOLATUS*, Miq. Tagalo, Bancal; Sandanese, Kappel. This genus produces some fine timber trees.

113. *SARCOCEPHALUS SUBDITUS*, Miq.

114. *SARCOCEPHALUS GLABERRIMUS*, Miq.

115. *WENDLANDIA PANICULATA*, DC. Another timber tree

with a golden yellow corolla-tube. Common everywhere in the East extending to South China, and I have certainly seen it in Japan, near Simonosaki, or a closely allied species, probably *M. parviflora*.

119. *MORINDA CITRIFOLIA*, L. Tumbong-aso, Tagalo; Baja, Malays of Celebes, Nyaw-kyee, Burmese. Widely distributed in the East, and common in Australia within the tropics. It produces a poor fruit which has been mistaken for the "Leichhardt Tree" which is *Sarcocephalus cordatus*. *M. citrifolia* is only found close to the sea-side growing sometimes actually in salt water, which is a useful quality in some situations. The wood is deep brownish yellow, close-grained, light and very tough, altogether a valuable timber though small. The Indians use the root to obtain a yellow and red dye, very permanent when fixed with alum.

120. *PÆDARIA FÆTIDA*, L. Cantotai, Tagalo; Daun-kuntut, Malay; Kai-shi-tang, Chinese; Hekuso Kadzura, Japanese, also Yaito Bana. The second Japanese name has reference to the medicinal use which is as a moxa or substance used in surgery to produce a sore by means of slow combustion. This remedy is universally applied in China and Japan on different parts of the body according to the ailment. Thus one spot on each temple for a headache, five on the chest for a cold, seven between the shoulders along the spine for liver complaint and so forth. One meets daily instances of this kind of disfigurement. The weed is a common twiner in all the underwood of the middle island in Japan, and in Luzon, Philippines. Its fetid odor is a constant annoyance to botanists. The fibre is most valuable, and as fine as silk, though not in use.

121. *PÆDARIA TOMENTOSA*, Blume. Not nearly so common as the last species, nor extending to Japan.

122. *SPERMACOCE HISPIDA*, L. Bubu-lutang, Sundanese. This and the following species are insignificant tropical weeds, and amongst the commonest. They are small annuals which mingle



with the grass, sharing with insignificant Composites such an abundant growth that they cease to be noticed. They are as frequent and widely-spread in Africa as in Asia.

123. *SPERMACOCE STRICTA*, L.

124. *SPERMACOCE SCABERREIMA*, Blume. Both these species equally common and diffused.

### COMPOSITÆ.

All the members of this order on the Volcano of Taal are small unimportant weeds, and this is the case throughout the Philippines. The order has but few representatives in the islands, and these are unimportant.

125. *VERNONIA CINEREA*, Less. This common little weed, with small purple flowers like a small sow-thistle, is well represented in Australia as far south as Twofold Bay.

126. *AGERATUM CONYZOIDES*, L. A common weed over all the

134. *BIDENS PILOSA*, L.

135. *EMILIA SONCHIFOLIA*, DC.

To all the above the same remarks which have been made on the first few are applicable. *Spilanthus acmella* is used as a salad. Mr. A. A. Black in the "Treasury of Botany," says, that in Japan it is called Hoko So. I found that near Nagasaki, Oranda Sennichi was the Japanese term which has reference to the Dutch using it as a salad. It is also called Sennichi-kiku or daisy-salad.

#### APOCYNACEÆ.

136. *ALSTONIA SCHOLARIS*, R. Br. Dirita, Tagalo, also Batino ; Gabus, Malay ; Let-topi, Burmese. A smooth evergreen tree called the Devil Tree or Palimara about Bombay. Its tall stems with regular whorls of leaves make it a showy member of the jungle. Like our Australian *Alstonia* its milky sap is a very bitter tonic, though it is little used. The wood is white, light and close-grained, but perishable. It is principally used by the Indians and Burmese to make sword scabbards.

137. *ALSTONIA MACROPHYLLA*, Wall.

138. *ORCHIPÆDA FÆTIDA*, Blume. A tree with opposite oblong smooth leaves, not common but found throughout the Archipelago among bushes on the mountains. The Malays call it Bunga, also Pohun-Badah or the rhinoceros tree from its having a fetid smell like that of a rhinoceros.

139. *TABERNÆMONTANA SPHÆROCARPA*, Blume. Pandacaqui, Tagalo and Visayan ; Jawie-jawie (?) Malay. Six or seven species of this genus are known in the Philippines, and there are probably many more. In individuals no country is more abundantly supplied. *Tabernæmontana* meets one everywhere ; on the road sides, in waste places, and on the edges of jungles. I have mentioned already how the slopes of the volcano are abundantly clothed with small trees of *Acacia farnesiana*. In the same locality *Tabernæmontana sphærocarpa* is quite as abundant. The

obliquely oblong or nearly globular orange fruits frequently united at the base in pairs are well-known and somewhat pretty objects, which meet one on every side. A small species (*T. orientalis*) has become a common and abundant weed about Cairns in Queensland. As far as I have seen I should say that the Philippine Group is emphatically the home of *Taberna montana*.

140. *TABERNÆMONTANA PANDACAQUI*, Poiret.

141. *HOLARHENA MACROCARPA*, Hassk. A small genus of insignificant trees and shrubs which are not unfrequent in the dry open forests of the tropics of Asia. *H. antidysenterica* is much esteemed for the medicinal qualities which the name implies. It produces the Connessi Bark of the Materia Medica, valued as a tonic and febrifuge.

142. *WRIGHTIA TOMENTOSA*, Roem. et Sch. Lanete, Tagalo: Bien-taus, Sundanese. Dispersed over tropical Asia, and probably found in Australia under the name of *W. pubescens*. Mr. Benthams says that a specimen in Cuming's collection from the

flowers. Very common in Java, but in all the cultivated lands of India and the Archipelago, including Burmah. It is especially common in fields that are lying fallow, but it is also cultivated for medicinal purposes. It yields the Mudar root (*Radix mudaris gigantea*), to which many medicinal qualities have been attributed, the sum of which seems to be this, that the root contains about 11 per cent. of an extracted bitter principle called Mudarine, which excites vomiting, and hence it has been used as a substitute for ipecacuanha. Mudarine has the extraordinary property of gelatinising when heated, and returning to the fluid state when cool. The fibre of the stem is valued, and the down of the seeds is usefully mingled with cotton in spinning. The plant is highly esteemed throughout all the various nationalities of the East.

148. *ASCLEPIAS CURASSAVICA*, L. A quite recently introduced plant from S. America, which is as common in Australia as it is in India. It extends through South China to Japan, where it is called To-wata, or cotton.

149. *GYMHEMA SYRINGIFOLIUM*, Benth. and Hook. A twiner; the genus has a wide range in tropical Asia, though this species I never collected except on the volcano of Taal.

150. *TYLOPHORA TENUIS*, Blume. Batuk-manuk, Sundanese. The genus is like the last in its characters, and is noted for possessing the Ceylon Binooga or *T. asthmatica*, the roots of which seem to have all the qualities of ipecacuanha besides being good for asthma. I have collected this species in Perak, Java and the Philippines, generally on the edges of jungles in the plains.

151. *DISCHIDIA NUMMULARIA*, R. Brown. Duduitan, Sundanese; Daun-ringit, Malay. This interesting little plant is parasitic on the trunks of large trees, and having small disc-like fleshy leaves, in pairs, has a very ornamental appearance as it hangs in festoons from branches in the jungle. Common everywhere in the Archipelago and extending to Australia.

152. *HOYA CUMINGIANA*, Decaisne. A species of the well-known wax plant. My dried specimens are very imperfect, and I am not at all sure of the species.

## LOGANIACEÆ.

153. *BUDDLEIA NEEMDA*, Hamilton in Roxburgh. Talic-nono, Tagalo; Ki-hiriesan and Sembung-lanang, Sundanese and Malay. A shrub common throughout the Archipelago; the specific name is an alteration of the vernacular name Nimda in Chittagong. This or a closely allied species (*B. asiatica*, Lour. ?) is called Kyoung-mee-koo in Burmah, where it is common everywhere in deserted clearings, savannah forests and along river banks.

## BORAGINACEÆ.

154. *CORDIA MYXA*, L. Amnonang also Banalo, Tagalo; Aipaka, Amboyna, the Malays generally Baru-laut. This species is dispersed over tropical Asia from Ceylon to the Philippines, and extends into Australia as far as the limits of the colony of Queensland. The pulp is extremely tenacious, and is used for bird-lime

I have generally seen it in the marshy vegetation at the mouths of the rivers. The flowers were always yellow or white. According to Thozet, the flowers are blue. Other collectors describe them as whitish or pure white. The Philippine specimens referred to by De Candolle are rather more hairy (Bentham).

158. *HELIOTROPIMUM INDICUM*, L. A very common south Asiatic weed which I have met with all through the Archipelago, but which has not as yet extended to Australia.

### CONVOLVULACEÆ.

159. *IPOMŒA BONA-NOX*, L. A large twining convolvulus with cordate leaves on a smooth stalk two or three inches long, with large white salver-shaped flowers nearly five inches in diameter. Common in the jungle and amongst shrubberies, along river-sides all over India, Burmah, the Malay Archipelago and the Philippines. I have heard one species called Ampas-ampas.

160. *IPOMŒA QUAMOCLIT*, L. This pretty little carmine-flowered climber has been cultivated for ornament, but is now established as a weed in the new and old worlds. It is believed to be of Indian origin.

161. *IPOMŒA REPTANS*, Poir. A prostrate floating species found in wet, sandy places, or floating in water, in many parts of tropical Asia and Africa. Corolla pink, purple or white, about an inch and a half long.

162. *IPOMŒA PES-CAPRÆ*, Roth. On every strand in the tropics, in Australia as far as New South Wales, and in every warm climate of the new and old world. The leaves are on long stalks and the flowers are purple. In Celebes it is called Batata-pantei. The natives in every country where it grows have great faith in the leaves employed as a poultice in rheumatic affections.

163. *IPOMŒA BATATAS*, L. Malay, Ubi, which is also applied to the common potato; Keledok is the common Malay name for the sweet potato. The origin of this plant, universally cultivated

in the tropics, is extremely doubtful. The whole question can be seen in De Candolle, loc. cit. He gives the name in China as Chu ; in Puntì I find the name is Fan-shu ; in Japanese it is called Satsuma-imo and Riukiu-imo. Common potatoes are called Jagatara-imo, Imo being an edible root. It is one of the most important articles of diet in Japan—a small red variety.

164. *IPOMŒA PES-TIGRIDIS*, L. A species with the leaves palmately five-lobed and peduncled, with many funnel-shaped purplish flowers. Common in the East Indies, Archipelago and Philippines.

165. *IPOMŒA SEPIARA*, Kœnig, MS., Wall. Fl. Ind. A very common species in India, the Archipelago, and China, with oblong cordate leaves and clusters of large flowers of a beautiful rose colour.

166. *LEPISTEMON RENIFORMIS*, Hasselquist. A climbing perennial herbaceous member of the convolvulus order of no particular interest.

where vegetables are so few, it is a valuable addition to the culinary resources. In Japan no vegetable is of such service. From June to September inclusive, it crowds the markets and shops, and is seen on every table, and with the Japanese modes of cooking it is certainly very palatable. There are many varieties differing mostly in shape, for the deep purple colour prevails in all. They are shaped like bananas or like pears, but the large variety in Japan is balloon-shaped, three and four inches long, and as much in diameter. The thin white margin round the fruit at its junction with the calyx makes it exceedingly pretty. The species thrives well in Australia, as I know from experience, and at present we have no vegetable to compare with it ; yet it is not used.

170. *SOLANUM TUBEROSUM*, L. Ubi, Malay ; Patata amongst the natives in the Philippines ; Chinese, Shu ; Japanese, Jagatara-imo. Potatoes of excellent quality are grown in the volcanic soils of the Philippines. The introduction of this plant into the islands is difficult to trace ; I made many enquiries but could find no trace in the Spanish literature. The history of the potato has been made the subject of especial study by De Candolle, and perhaps I may be allowed to insert here a summary of his conclusions :—  
“(1) That the potato is wild in Chili in a form still seen in our cultivated plants. (2) It is very doubtful whether its natural home extends to Peru and New Granada. (3) Its cultivation was diffused before the discovery of America from Chili to New Granada, (4) It was introduced in the latter half of the 16th century into that part of the United States now known as Virginia and North Carolina. (5) It was imported into Europe between 1580 and 1585, first by the Spaniards and afterwards by the English at the time of Raleigh's Voyages to Virginia.”

171. *SOLANUM FEROK*, L. Karon-dung, Sundanese. A common shrub in India, Java, Borneo, &c., but probably introduced as it is cultivated. A thorny plant with globular berries an inch or more in diameter.

172. *SOLANUM SANCTUM*, L. Another cultivated species introduced from Palestine. Fruit small and globular.



173. *PHYSA LIS PERUVIANA*, L. Potocan, Tagalo ; Daun-doba, Malay ; Hodzuke, Japanese. The Cape Gooseberry so prized for making preserves in Australia, of which Mr. Benthams says that, though of South American origin, it is perhaps really indigenous in the Pacific Islands, but in the Philippines, as in Australia, it has been introduced.

174. *LYCOPERSICUM ESCULENTUM*, Miller. Sangogiu-nasubi in Japanese, for in all the Indian Archipelago it is called by its Spanish name of tomate from the American name Tumatle. The Chinese call it Fan-ke, but in all the Asiatic countries its introduction does not date much beyond a couple of centuries back. De Candolle thinks it is of Peruvian origin. Both in the Malay Archipelago and in the Philippines it has become almost naturalized as it is in Australia, and especially in the tropics. In this quasi wild state the fruit loses its large irregular development, and becomes small and spherical like the variety called *L. cerasiforme*, which De Candolle thinks is the same species. This is the manner in which we see it naturalized in old clearings or near gardens.

178. *DATURA ALBA*, Nees. Talamponai, Visayan ; Kuchubungputi, Malay. Very common throughout the East, with large white flowers. It extends to China and Japan, where it is called Chosen-asago. Narcotic virtues are attributed to this plant, and in more than one country it is used to cause intoxication or stupefaction.

179. *NICOTIANA TABACUM*, L. Tembakau, Malay ; Yen, Chinese. Though the Asiatic people are great lovers of tobacco, none at all approach to the natives of the Philippines in this respect. Men and women smoke unceasingly, and even children begin the habit when quite infants. The Philippine natives surpass all other Asiatics in the cultivation and preparation of the plant. Though the American origin of this plant has been disputed, it is proved almost beyond question. Out of fifty species of the genus *Nicotiana* two only are foreign to America—one a native of Australia, and the other of New Caledonia.

#### SCROPHULARIACEÆ.

180. *TORENIA CARDIOCEPHALA*, Benth. Small Mimulus-like shrubs found in shady or damp places with purple, bluish or yellow blossoms. They are elegant wild flowers.

181. *TORENIA EDENTULA*, Griff.

182. *VANDELLIA CRUSTACEA*, Benth. A small tropical weed widely diffused and extending to Australia ; it is a much-branched rambling annual with minute purple flowers. It is found also in Africa and America.

183. *SCOPARIA DULCIS*, L. Another weedy annual with the same wide diffusion. It is a larger plant, the leaves usually in whorls of three, and the flowers white.

#### OROBANCHACEÆ.

184. *ÆGINETIA INDICA*, Roxb. The small parasitic plants which compose this order are not well represented in the tropics.

This species is widely diffused from India to the Archipelago. It is parasitic on the roots of grasses, with an elongated simple naked scape with one flower, corolla purple, calyx yellow.

### BIGNONIACEÆ.

185. *OROXylum indicum*, Benth. A small deciduous tree, with large showy purplish flowers, with a yellow tube on short and very thick pedicels. Common in all jungles throughout the East and the Philippines. In Tagalo it is called Pinca-pincahan.

186. *Dolichandrone rheedii*, Seem. In Tagalo, Tua. An unimportant tree, which is common in the Philippines, and has a habitat amongst the mangroves.

### ACANTHACEÆ.

187. *Blechnum brownei*, Tussac. An unimportant herbaceous



191. *GMELINA ASIATICA*, L. All along the coasts and in the swampy forests, from India to the Philippines, its showy racemes of bell-shaped yellow flowers, make it a conspicuous and ornamental object. It is particularly abundant in Perak, about Malacca, and in Singapore. The Visayan Indians call it Bago-bago. The bark and roots of this tree are used medicinally by the natives.

192. *CLERODENDRON INFORTUNATA*, L. Casopanguil Tagalo. A common evergreen shrub with white flowers in an ample panicle. Common in the tropical and moister forests up to three thousand feet all over the Archipelago and Philippines. The genus is well represented in the jungles throughout the East, producing several species which have highly ornamented red, blue, and white flowers.

#### LABIATÆ.

193. *OCIMUM GRATISSIMUM*, L. This and the following species have no doubt been introduced for their aromatic qualities.

194. *OCIMUM SANCTUM*, L. Frequently planted round Hindoo temples.

195. *MOSCHOSMA POLYSTACHYUM*, Benth. A common garden plant kept for its musky odour.

196. *HYPTIS CAPITATA*, Jacq.

197. *HYPTIS BREVIPES*, Poiteau.

198. *HYPTIS SUAVEOLENS*, Poiteau. This has become one of the most terrible weeds throughout the Indian Archipelago. It forms dense thickets to the exclusion of every other kind of vegetation. When withered these thickets are quite impenetrable. In North Australia it is becoming equally troublesome, though introduced only within the last few years. I have seen excellent land in the Malay Peninsula, Java, Borneo, Celebes and the Moluccas quite destroyed by this pest.

199. *ANISOMELES OVATA*, R. Br. This is one of the sweet smelling musk plants with all the qualities possessed by the well-known musk plant of North Australia.

202. *BOERHAAVIA*  
warmer regions of A  
ground in rich alluv  
pink flowers. In In  
a remedy for measles

203. *DEEBINGIA* C  
climber scrambling o  
Common in East I  
Australia and New C

204. *AMARANTUS* I

205. *AMARANTUS* C

206. *AMARANTUS* V

207. *ÆRVA* JAVAN

208. *ACHYRANTHES*

209. *ALTERNANTHE*  
above are common in  
and sub-tropical region

C

### ARISTOLOCHIACEÆ.

212. *ARISTOLOCHIA TAGALO*, Chamisso. A jungle species of this remarkable genus of climbers, which I did not see.

### PIPERACEÆ.

213. *PIPER CHABA*, Blume.

214. *PIPER CANINUM*, Adietr. The above are amongst the many native kinds of pepper growing in the East.

215. *PEPEROMIA EXIGUA*, Miq. One of the many small fleshy creeping plants of the order growing on trunks of trees, but of no importance.

### LAURACEÆ.

216. *CASSYTHA FILIFORMIS*, L. One of the common Indian leafless dodder-laurels, widely spread over tropical Asia, Africa and America, but chiefly near the sea. It extends to Australia, and probably to New Zealand. The genus is, however, chiefly Australian, with the exception of the one species here enumerated. The habit is in every way that of the European *Cuscuta*. It is the wire-like vine which makes so many of the Queensland scrubs quite impenetrable.

### EUPHORBIACEÆ.

217. *EUPHORBIA THYMIFOLIA*, L. A small procumbent Indian weed.

218. *EUPHORBIA PILULIFERA*, L. A common weed which follows cultivation in warm climates all over the world. It has lately come into notice in Australia as a remedy for asthma and diseases of the chest.

219. *BRIDELIA STIPULARIS*, Blume. A large scandent shrub with bluish-black berries and tawny leaves, common in all mixed forests, especially those near the sea throughout Malaysia and the Philippines. The Sumatran Malays call it Aka-buah. In the Philippines the leaves are used sometimes as a substitute for tobacco.

220. *PHYLLANTHUS NIBURI*, L. There are numerous species of this large genus containing trees, shrubs, and herbs, throughout the East. They are well represented in the Philippines, but as yet there has not been sufficient botanical exploration in the islands to fix the number of species.

221. *PHYLLANTHUS LLANOSII*, Müller.

222. *PHYLLANTHUS URINARIA*, L.

223. *PHYLLANTHUS SIMPLEX*, Retz.

224. *PHYLLANTHUS RETICULATUS*, Poir.

225. *SECURINEGA OBOVATA*, Müller. A leaf-shedding large shrub, common in the grassy jungles near water all over the East from India to the Philippines. Genus in omnibus *Phyllantho* convenit, excepto ovarii rudimento in fl. mas. evoluto. Gen. Plant. Benth. et Hook. IIL 276.

226. *BREYNIA CERNUA*, Müller. A glabrous shrub spread over tropical Asia and part of Australia.

has now even in the most remote villages, this oil and cocoa-nut oil supplied all purposes of illumination ; but it is now almost entirely superseded. It is a beautiful pale yellow color. In India it is called Katamanak. Bhoga bhirinda is an inferior kind of oil from the same source. It has been of late years imported into Britain as a substitute for linseed oil. It answers equally well, and can be obtained from India at a price far below linseed. Quantities of the seed have also been imported into Liverpool from the Cape Verde Islands. It seems to have met with considerable favor wherever it has been tried. The Chinese boil this oil with oxide of iron, and employ it for varnishing boxes.

230. *JATROPHA MANHIOT*, L. Manihoc or Maniot or Tapioca is not extensively cultivated in the Islands. When travelling in the interior of the Malay Peninsula, one of my principal sources of subsistence was the roots of the maniot boiled like potatoes. They were exceedingly nourishing and palatable, the flavour being something between the sweet and the common potato. Being of large size and cheap, they were a most useful article of food, especially where vegetables are so scarce. The only precaution necessary to get rid of the poisonous juice was to carefully peel and boil them. The maniot is extensively cultivated in the Malacca state, and in Brunei, Borneo, but lately it does not pay.

231. *CROTON CAUDATUS*, Geisel. It is supposed that there are eight or ten species of this interesting genus in the Philippines.

232. *ACALYPHA INDICA*, L. Of this genus there are about ten or a dozen species in the Philippines. They are unimportant, except one or two species with variegated leaves. *A. indica*, an annual Indian weed like a nettle, is said to attract cats like Valerian. A decoction of the leaves is used as a purgative.

233. *MALLOTUS PHILIPPINENSIS*, Muell. Arg. A tree with a ferruginous tomentum on the ends of the branches, which is said to be a powerful vermifuge. It is widely spread throughout the East, and very common in North Queensland.



234. *MACARANGA TANARIUS*, Müll. Arg. A tall, erect shrub, with large orbicular peltate leaves sometimes a foot in diameter. It is found from the East Indies to South China near the coast, and forms a conspicuous portion of all the jungles, especially on their edges. It is very common around Moreton Bay.

235. *RICINUS COMMUNIS*, L. Tangan-tangan, Tagalo ; Charak, Malay. As in Australia this showy plant has become an introduced weed. It is, according to De Candolle, probably a native of Abyssinia, Sennar and the Kordofan. It is cultivated in America, and even the ancient Egyptians cultivated it, because the seeds are found in their tombs. The Egyptian name was Kiki retained in modern Greek, while the Arabs call it Kerua. See De Candolle, who says that it is supposed that the Kikajon of the Old Testament, the growth of a single night, was this plant. The English name Castor Oil is from its having been called *Agnus Castus* in the West Indies.

#### URTICACEÆ.

also the Malay name for fig throughout the whole of the Archipelago. This genus (*Ficus*) is certainly one of the most characteristic of the Malay flora, and there is good reason for supposing that there are more than a hundred species in the Philippines alone, and as far as I was able to remark, each island seems to have some peculiar species. The genus almost takes the place in the Archipelago that the Eucalypts do in Australia. The timber is, in general, useless. Many species are common to Australia.

240. *FICUS HIRTA*, Vahl.

241. *FICUS WASSA*, Roxb. Gohi, Malay. The natives use the bast for tow. The young leaves and fruits are cooked and eaten.

242. *FICUS ALTIMERALOO*, Roxb. More common in the Moluccas, where it is called Bunga-jangan.

243. *FICUS ASPERA*, Forster. Called in Sundanese Aroi-konjal, and this is a name for several other descriptions of *Ficus*.

244. *FICUS RADIATA*, Decaisne.


245. *POUZOLZIA INDICA*, Gaudichaud. A diffuse perennial with the habit of a parietaria or pellitory, with the stems from six to twelve inches long. Common in East India and the Archipelago, and extending to Australia.

246. *PIPTURUS ASPER*, Weddell. Dalonot, Tagalo; in Malay, Ki-buntur. A small tree with a wider diffusion than the last, as it extends to the Pacific Islands and Mascarene Group.

#### HYDROCHARIDACEÆ.

247. *ENHALUS KOENIGII*, Rud. A submerged water-plant like the frog-bit of Europe, except that it has linear leaves. This is one of the few salt-water genera, and is found all through the lagoon.

248. *PISTIA STRATIOTES*, L. In all the fresh-water streams and lakes of the Malay Archipelago, and in the Philippines the surface of the water is covered with small plants which look very like



as a food for pigs,  
probably poisonous.  
the plant is grown to  
rapidity as to cover  
It is called the water

249. MUSA SAPIEN  
it Platanus or Abaca  
the species from wh  
obtained. I must b  
somewhat lengthy re  
species, in order that  
I have gained in my  
is of unusual interest  
three indigenous speci  
distinguishable from  
is from "The Origin c

"Bananas were gene  
Asia, and to have bee  
Humboldt threw doubt

He admits, on the authority of Oviedo,\* its introduction by Father Thomas of Berlangas from the Canaries into San Domingo in 1516, whence it was introduced into other islands and the mainland.† He recognises the absence of any mention of the banana in the accounts of Columbus, Alonzo Negro, Pinzon, Vespucci and Cortez. The silence of Hernandez who lived half a century after Oviedo, astonishes him, and appears to him a remarkable carelessness; "for," he says,‡ "it is a constant tradition in Mexico, and on the whole of the mainland, that the *Plantano arton* and the *dominico* were cultivated long before the Spanish conquest." The author who has most carefully noted the different epochs at which American agriculture has been enriched by foreign products, the Peruvian Garcilasso de la Vegas§ says distinctly that at the time of the Incas, maize, quinoa, the potato, and, in the warm and temperate regions, bananas, formed the staple food of the natives. He describes the *Musa* of the valleys in the Andes; he even distinguishes the rarer species with a small fruit and a sweet aromatic flavour, the *dominico* from the common banana or *arton*. Father Acosta|| asserts also, although less positively, that the *Musa* was cultivated by the Americans before the arrival of the Spaniards. Lastly, Humboldt adds from his own observation, "On the banks of the Orinoco, of the Cassiquaire or of the Beni, between the mountains of Esmeralda and

---

\* Oviedo, Hist. Nat. 1556, p. 112. Oviedo's first work is of 1526. He is the earliest naturalist quoted by Dryander (Bibl. Banks) for America. (The full title of Oviedo's work is "Gonzalo Fernandez de Oviedo y Valdez Sumario dela Natural y General Istoria de las Indias, Toledo 1526. Fol. 52 foll. Another edition is entitled "Primera part de la Historia Natural y General de las Indias, Yslas y tierra firme del Mar Oceano." Sevilla 1535, folio CXCI. foll., with one plate of very rude wood engravings. Books VII, VIII, IX. and X. refer to botanical subjects. The book was translated from Castilian into French in Paris by Michel de Vascosan in 1555. folio 134 foll. and one plate of wood engravings. There exist only the ten first books of this work. It appears to have been the French translation that De Candolle refers to.)

† I have also seen this passage in the translation of Oviedo by Ramusio, III. p. 115.

‡ Humboldt, Nouvelle Espagne, 2nd. Edit. p. 385.

§ Garcilasso de la Vega, Commentarios Reales, I. p. 282.

|| Acosta, Hist. Nat. de Indias, 1608, p. 250.



able work, published in 1793, on the bananas cultivated in the West Indies. In this species he distinguishes two groups; the large (the long) and the small-fruited (the short) called fig bananas. Brown, in his *History of the Congo*, p. 51, mentions the bananas cultivated in the Congo from considering them as distinct from the wild *Musa sapientum* adopts the name *Musa sapientum* for the varieties with small fruit, and the name *Musa sapientum* for the variety of the wild *Musa*.

Brown remarks on the species of the genus *Musa* that he pretends to have found in the West Indies a fertile fruit, as has been done by Marcgraf considered the fruit from Congo. In spite of this Humboldt, in his second voyage (II. p. 397), does not mention that the traveller Caldclegh had found that a small species of banana in the Prato long before

*Musa*, for instance *paruru* in Tamanac, &c., *arata* in Maypur. I have also read in Stevenson's travels\* that beds of the leaves of the two bananas commonly cultivated in America have been found in the *huacas* or Peruvian tombs anterior to the conquest; but as this traveller also says that he saw beans in these *huacas*, a plant which undoubtedly belongs to the old world—his assertions are not very trustworthy. Boussingault† thought that the *platano arton* at least was of American origin, but he gives no proof. Meyen, who had also been in America, adds no argument to those which were already known,‡ nor does the geographer Ritter,§ who simply reproduces the facts about America given by Humboldt.

On the other hand, the botanists who have more recently visited America have no hesitation as to the Asiatic origin. I may name Seeman for the Isthmus of Panama, Ernst for Venezuela, and Sagot for Guiana.|| The two first insist on the absence of names for the banana in the languages of Peru and Mexico. Piso knew no Brazilian name. Martius¶ has since indicated, in the Tupi language of Brazil, the names *pacoba* or *bacoba*. This same word *bacove* is used, according to Sagot, by the French in Guiana. It is perhaps derived from the name *bula* or *palan* of Malabar, from an introduction by the Portuguese subsequent to Piso's voyage.

The antiquity and wild character of the banana in Asia are incontestable facts. There are several Sanscrit names.\*\* The Greeks, Latins, and Arabs, have mentioned it as a remarkable Indian fruit tree. Pliny†† speaks of it distinctly. He says that the Greeks of the expedition of Alexander saw it in India, and he quotes the name *pala* which still persists in Malabar. Sages reposed beneath its shade and ate its fruit. Hence the botanical name *Musa sapientum*. *Musa* is from the Arabic *mouz* or *mauuz*, which we

---

\* Stevenson, Trav. in S. Amer., I. p. 328.

† Boussingault, C. r. Acad. Sc. Paris, May 9th, 1836.

‡ Meyen, *Pflanzen Geog.* 1836, p. 383.

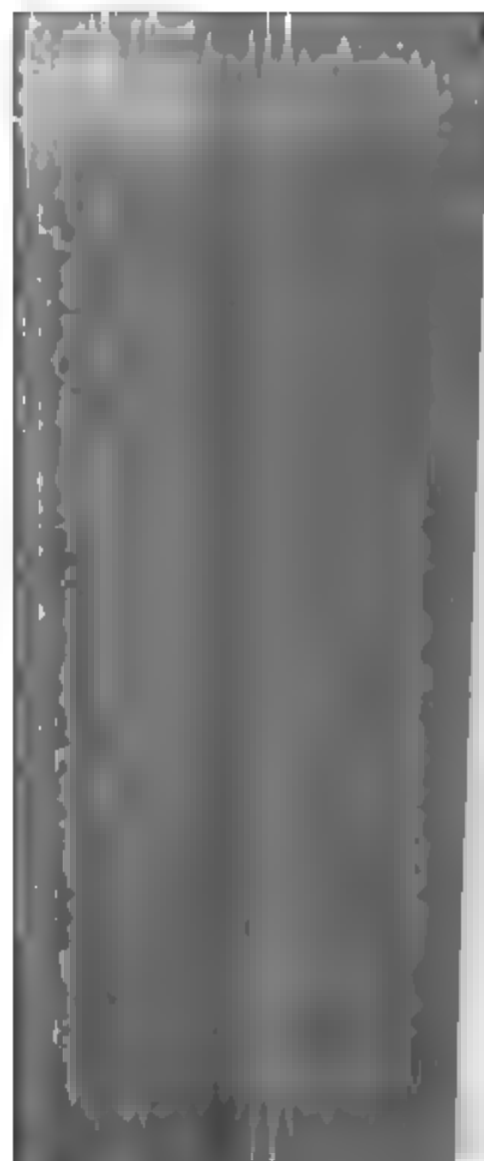
§ Ritter, *Erdk.* IV. p. 870.

|| Seeman, Bot. of the Herald, p. 213; Ernst, in Seeman's Journ. of Botany, 1867, p. 289; Sagot, Journ. de la Soc. d'hort. de Fr. 1872, p. 226.

¶ Martius, *Eth. Sprachenkunde Amer.* p. 123.

\*\* Roxburgh and Wallich, *Fl. Ind.* II. p. 485; Piddington, *Index*.

†† Pliny, Hist. lib. XII. cap. 6.



of Asia, both on th  
of these varieties c  
from an epoch imp  
the islands of the I  
the varieties bore  
languages, such as C  
great antiquity of  
Asia, and a diffusio  
of the human races

The banana is sai  
This is the more wo  
seldom produce see  
species can hardly b  
sowing itself. Rox  
in the form of *M.*  
variety with small  
probably speaks of  
*agrestis*, which he c  
is wild in Cochin Cl  
in the Philippines, b  
the banana wild in

\* Unger *ubi supra*, a  
banana is now cultivate

† Forster, *Plant. Ec.*

at the southern extremity of Siam. Thwaites\* saw the variety *M. sapientum* in the rocky forests of the centre of Ceylon, and does not hesitate to pronounce it the original stock of cultivated bananas. Sir Joseph Hooker† and Thompson found it wild at Khasia.

The facts are quite different in America. The wild banana has been seen nowhere except in Barbados,‡ but here it is a tree of which the fruit does not ripen, and which is consequently in all probability the result of cultivated varieties of which the seed is not abundant. Sloane's *wild plantain*§ appears to be a plant very different to the *Musa*. The varieties which are supposed to be possibly indigenous in America are only two, and as a rule far fewer varieties are grown than in Asia. The culture of the banana may be said to be recent in the greater part of America, for it dates from but little more than three centuries. Piso|| says positively that it was imported into Brazil, and has no Brazilian name. He does not say whence it came. We have seen that, according to Oviedo, the species was brought to San Domingo from the Canaries. This fact and the silence of Hernandez, generally so accurate about the useful plants, wild or cultivated in Mexico, convince me that at the time of the discovery of America the banana did not exist in the whole of the eastern part of the continent.

Did it exist then in the western part on the shores of the Pacific? This seems very unlikely when we reflect that communication was easy between the two coasts towards the Isthmus of Panama, and that, before the arrival of the Europeans, the natives had been active in diffusing throughout America, useful plants like the manioc, maize, and potato. The banana which they have prized so highly for three centuries, which is so easily multiplied by suckers, and whose appearance must strike the least observant,

---

\* Thwaites, *Enum. Pl. Cey.* p. 321.

† Aitchison, *Catal. of Punjab*, p. 147.

‡ Hughes, *Barb.* p. 182, Maycock, *Fl. Barb.* p. 396.

§ Sloane, *Jamaica*, II. p. 148.

|| Piso, edit. 1648, *Hist. Nat.* p. 75.



adopt the contrary  
call it *plane* (for the  
the case of their  
them."† He goes  
(*Platanus*) of the  
and adds that the  
America), "although  
. . . There is a  
delicate, which is  
others coarser and  
Peru, but they are  
Mexico from Cuern  
nent and in some  
them which form the  
author would express  
American origin. I  
above all, he would  
of foreign origin. I

---

\* Humboldt quotes 1  
1591. I have only been  
which is apparently acc

† Acosta, trans. lib.

‡ That is probably the  
Spanish language. It was  
the capital letter.

may well have taken place between the epoch of the conquest and the time when Acosta wrote, since Hernandez, whose conscientious researches go back to the earliest times of the Spanish dominion in Mexico (though published later in Rome) says not a word of the banana.\* Prescott, the historian, saw ancient books and manuscripts which assert that the inhabitants of Tumbez brought bananas to Pizarro when he disembarked on the Peruvian coast, and he believes that its leaves were found in the *huacas*, but he does not give his proofs.†

As regards the argument of the modern native plantations in regions of America, remote from European settlements, I find it hard to believe that the tribes have remained absolutely isolated and have not received so useful a tree from colonized districts.

Briefly, then, it appears to me most probable that the species was early introduced by the Spanish and Portuguese into San Domingo and Brazil, and I confess that this implies that Garcilasso was in error with regard to Peruvian traditions. If, however, later research should prove that the banana existed in some parts of America, before the advent of the Europeans, I should be inclined to attribute it to a chance introduction, not very ancient, the effect of some unknown communication with the islands of the Pacific or with the coast of Guinea, rather than to believe in the primitive and simultaneous existence of the species in both hemispheres. The whole of geographical botany renders the latter hypothesis improbable, I might almost say impossible, to admit, especially in a genus which is not divided between the two worlds.

In conclusion, I would call attention to the remarkable way in which the distribution of varieties favors the opinion of a single species—an opinion adopted, purely from the botanical point of view, by Roxburgh, Desvaux, and R. Brown. If there were two or three species, one would probably be represented by the varieties

---

\* I have read through the entire work to make sure of this fact.

† Prescott, *Conquest of Peru*. The author has consulted valuable works; among others, a manuscript of Montesinos of 1527; but he does not quote his authorities for each fact, and contents himself with vague and general indications which are very insufficient.

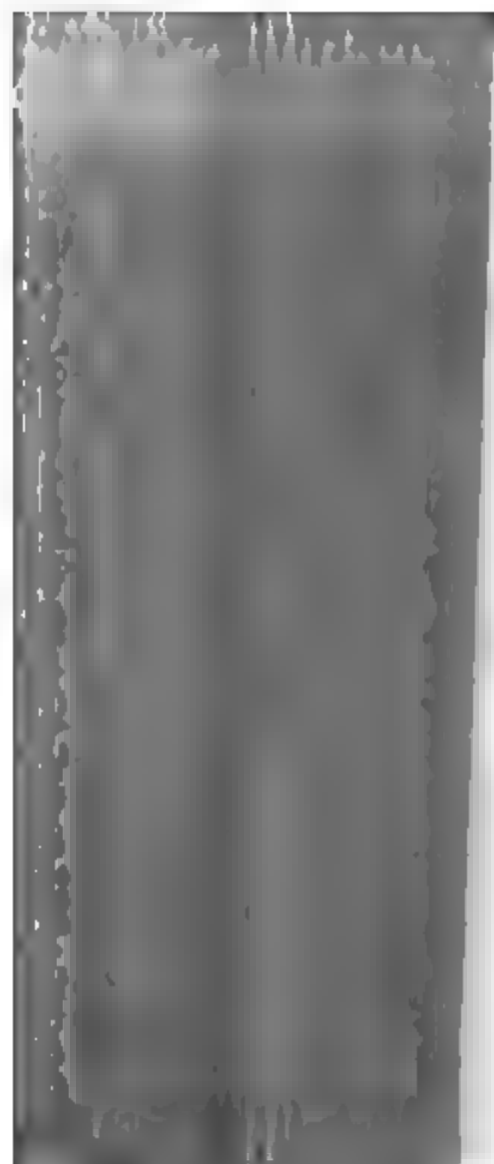
It may throw some light  
have three species of *M*  
doubtfully separated from  
are distinct or not there  
which the wild banana grows  
the Malay Archipelago and  
As one ascends the lower  
Malay Peninsula the general  
growth of wild bananas  
never see any difference in  
occurrence, and *M. banksii*  
species in the colony, near

It would scarcely be found  
the jungle in many parts of  
Philippines, or in the late  
article of export. Then  
the province of Iloilo near  
the native name for the plant  
This village has been so  
hemp, which is said to be  
used for a time. The species  
*textilis* by botanists, the  
Visayan languages, while  
or hemp tree. In the late

and the natives scarcely use any other for sewing purposes. It is very tough. The finer portions of the fibre are used for weaving. A very serviceable and rather fine and glossy material is made from it, of rich golden colour and something like silk.

Abaca may be said to be, next to tobacco, the most important product of the Philippines. It is far more important than cotton. The plant grows to about fourteen feet high, producing a fruit which is quite uneatable. It grows with much rapidity. Many varieties are known, according to the kind of fibre which they produce, and each has a special name. At the end of three years, when the top blackens and bends, the outward bark is stripped off. It is cut in strips, soaked and beaten till the fibres are thoroughly separated, and then it is placed in the sun, taking care that it does not get mouldy. When dried it is washed again, and then dried again and gathered into bundles, as soon as all the foliaceous portions have been detached. It is propagated by suckers, which spring up at the roots of the old plant, and planted moderately closely, so that 5,000 square yards will grow 1,000 plants. When the plant is mature the bark is stripped every month, until the plant is five or six years old, when it dies.

It is not known when this culture and manufacture came to be introduced in the Philippines. Pigafetta curiously makes no mention of it, though he does mention the banana fruit and cotton. Dampier resided in Mindanao for six months in 1786, but he confounds the edible banana with that from which the hemp is obtained. He says: "As the fruit of this tree is of great use for food, so is the body no less serviceable to make cloths, but this I never knew till I came to this island. . . . When the fruit is ripe they cut it down close by the ground, if they intend to make cloth with it. One blow with a machete or long knife will strike it asunder: then they cut off the top, leaving the trunk eight or ten feet long, stripping off the outer rind, which is thickest towards the lower end. Having stripped two or three of these rinds, the trunk becomes in a manner all of one bigness, and of whitish colour. Then they split the trunk in the middle, which



their cloth to be all of  
stubborn when new—  
slimy. They make t  
their warp and woof al  
Voyages, Vol. I. Ch. x

Abaca is cultivated  
esteemed comes from A  
from the towns of Don  
Silk is mingled with t  
which are called Sina  
grows in much abundan  
hood of the towns of M  
Tananan, Calvallo, C  
Guian, Basey, Paranas.  
the island of Misamis.

The export of this m  
value or importance to  
proper place, and from c  
This is due to the al  
Americans are the princ

250. MUSA PARADISIA

251. MUSA ABACA OR

underground stems or branches of stems more or less tuberous, which become larger when the annual exposed part of the plant is near its decay. These rhizomes are important as articles of food. The Chinese call all yams Tai-shu or big potatoes. The Japanese name is Yama-no-imo or mountain-potato.

253. *DIOSCOREA TRIPHYLLA*, L.

254. *DIOSCOREA PENTAPHYLLA*, L.

255. *DIOSCOREA HIRSUTA*, Blume.

#### COMMELYNACEÆ.

256. *COMMELYN NUDIFLORA*, L. Little blue spider-worts with nothing remarkable about them except their pretty flowers which are generally seen in marshy places. The rhizomes of many of the species contain so much starch and mucilage that they are considered nutritious articles of food when cooked.

257. *COMMELYN BENGALENSIS*, L.

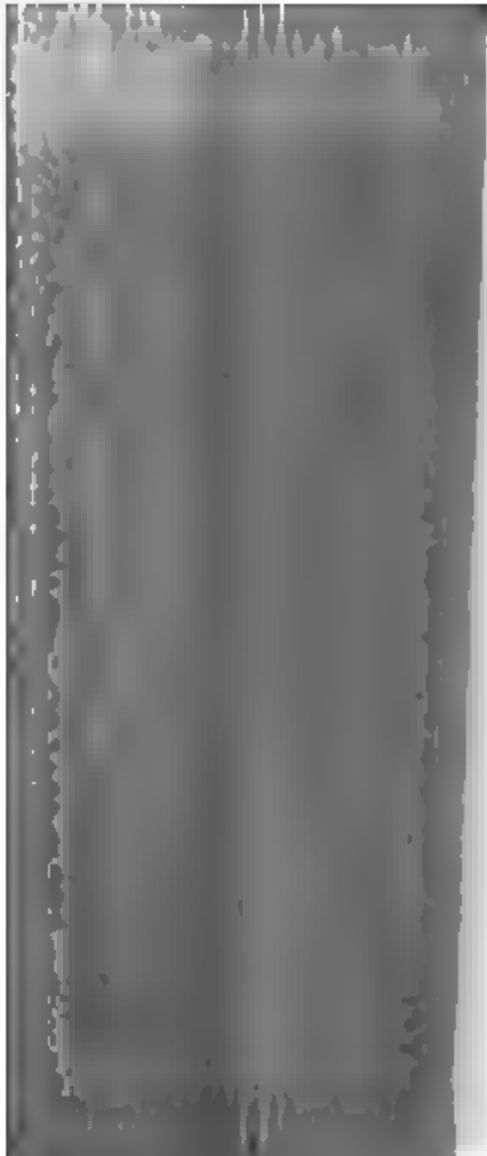
258. *ANEILEMA NUDIFLORA*, L. A widely spread species in the East extending to Australia.

259. *CYANOTIS AXILLARIS*, Rœm. et Schult. This smooth annual with long creeping branches, and flowers in short dense spikes in a leafy bract or sheath, is common throughout all the East.

260. *CYANOTIS CRISTATA*, Rœm. and Schult.

#### PANDANACEÆ.

261. *PANDANUS ODORATISSIMUS*, L. Pandan, Sabotan, Tagalo ; Daun-bagea, Malay. The well known screw pines or screw palms, of which there are no less than twenty-one species in the Indian Archipelago, and five in Australia, including the one mentioned above. Seven or eight are recorded in the Philippines, including the one mentioned here, which is widely spread over tropical Asia and the Malayan Archipelago. In Queensland the screw pines are called bread fruits. This may arise from the fact that the pith of *P. bagea* is made into a kind of bread with sugar in Amboyna, and when cooked is wholesome and palatable. The young leaves are also boiled and eaten as a vegetable, but I do not know whether this is true of more than one species.

- 
262. KYLLINGA IN  
263. KYLLINGA MC  
264. KYLLINGA TE  
265. CYPERUS PUM  
266. CYPERUS GLOI  
267. CYPERUS FLA  
268. CYPERUS PYGI  
269. CYPERUS BOTI  
270. CYPERUS KKA  
271. HELBOCHARIS  
272. FIMBRISTYLIS  
273. FIMBRISTYLIS  
274. SCIRPUS FLUM  
275. SCIRPUS GROSS  
276. RHYNCHOSPOR.  
277. CLADIUM MARI  
278. SOLERIA SCROI  
279. CAREX BENGAI

the island, though the list is larger than that of Señor Centeno. At the time of my second visit, every bit of grass was burnt off the island. I do not include all the cultivated species or varieties. For instance there are said to be nearly fifty species or varieties of Rice (*Oryza*).

280. *ZEA MAYS*, L. An American plant which came to Europe through the Spaniards, but had been previously cultivated in China. Still all this is a matter of much controversy, for which see Bonafous, *Histoire Naturelle Agric. and Economique du Maïs*, 1 vol. fol. Paris et Turin, 1886; see, also, De Candolle, loc. cit. The leaves of the maize plant are capable of yielding a nutritive substance or bread-stuff for human food, a fibrous material capable of being spun and woven like flax, and ultimately a pulp from which a most beautiful paper can be produced. So strong and durable is maize paper, and so great its natural transparency and firmness, that it can be used as an excellent substitute for glass in windows. Lately *Stigmata maidis* have enjoyed much repute as a remedy in nephritic disorders.

281. *BAMBUSA ARUNDINACEA*, Retz. Besides several other species or varieties of bamboo.

282. *ORYZA SATIVA*, L. Malay, Bras; Visayan, Bogas, besides many other terms.

283. *PASPALUM DISTICHUM*, L.

284. *PANICUM SANGUINALE*, L.

285. *PANICUM FLAVIDUM*, Retz.

286. *PANICUM DISTACHYUM*, L.

287. *PANICUM CRUS-GALLI*, L.

288. *PANICUM REPENS*, L.

289. *SETARIA GLAUCA*, Beauv.

290. *LAPPAGO RACEMOSA*, Willd



jungle grass or lalang of the Malay Peninsula.

297. *CHRYSOPOGON GRILLUS*, Trinus.

298. *CHRYSOPOGON ACICULATUS*, Trinus.

299. *SORGHUM HALEPENSE*, Pers. Probably an  
cultivation.

300. *ANTHISTIRIA CILIATA*, L.

301. *ARISTIDA DEPRESSA*, Retz.

302. *CHLORIS TRUNCATA*, R. Br.

303. *CHLORIS BARBATA*, Schwartz.

304. *CYNODON DACTYLON*, Pers.

305. *LEPTOCHLOA CHINENSIS*, Nees.

306. *SPOROBOLUS INDICUS*, R. Br.

307. *ERAGROSTIS TENELLA*, Beauv.

308. *ERAGROSTIS PLUMOSA*, Link.

309. *ERAGROSTIS PILOSA*, Beauv.

## FILICES.

310. *CLADONOMA DIACRYLADIS* Spreng.

314. *TRICHOMANES PARVULUM*, Poiret, or *SAXIFRAGOIDES*, Presl.
315. *DAVALLIA CILIATA*, Hooker.
316. *DAVALLIA VESTITA*, Bl.
317. *ADIANTUM LUNULATUM*, Burm.
318. *ADIANTUM CAUDATUM*, L.
319. *CHEILANTHES TENUIFOLIA*, Sw.
320. *ONYCHIUM AURATUM*, Kaulf. Very common in crevices  
of old walls and rocks about Manila.
321. *PTERIS LONGIFOLIA*, L.
322. *PTERIS CRETICA*, L.
323. *PTERIS ENSIFORMIS*, Burm.
324. *PTERIS QUADRIAURITA*, Retz.
325. *PTERIS AQUILINA*, L.
326. *PTERIS INCISA*, Thunb. Some small young plants which I  
found growing in cavernous crevices near Point Calavita, I  
doubtfully refer to this species, but it much resembled specimens  
which I have found under similar conditions in Australia.
327. *BLECHNUM ORIENTALE*, L.
328. *ASPLENIUM ESCULENTUM*, Presl.
329. *ASPIDIUM ACULEATUM*, Sw.
330. *POLYPODIUM SIMPLICIFOLIUM*, Hook.
331. *POLYPODIUM QUERCIFOLIUM*, L. (?)
332. *POLYPODIUM HOOKERI*, Bracken.
333. *VITTARIA ELONGATA*, Sw.
334. *DRYMOGLOSSUM PILOSELLOIDES*, Presl.
335. *ACROSTICUM AUREUM*, L.
336. *ACROSTICUM CONFORME*, Sw.
337. *LYGODIUM DICHOTOMUM*, Sw.

Besides the above, collections were made of a few fungi, lichens, and mosses, but they have not been determined.

The flora enumerated above is a singular one, as it is almost entirely confined to the common weeds of the Indian Archipelago, and plants brought into the island for cultivation and becoming naturalized. It is interesting, however, to observe what a very large proportion of these are plants which contain some useful or highly ornamental properties. Truly it may be said of the oriental flora that there is scarcely anything in the vegetable kingdom which is entirely useless or unimportant. The flora of the Taal volcano may be described as almost a derived one, due of course, to the fact that it has been over and over again destroyed by the eruptions of the mountain, and it is only those plants with facilities for spreading themselves which have had time to establish themselves on the slopes of the volcano. Though the flora of the Philippine Islands is not in general different from the

## FISHES.

During my short stay in the neighborhood of the lake of Bombon I had no opportunities for the collection of fishes. All I could do was to visit the fishermen's boats and see the kinds offered for sale. The number of species was not numerous, and those I could obtain a sight of, circumstances prevented me from subjecting to a careful examination or comparison. I believe amongst a number that I could not identify with the aid of the books at my disposal, the following common and widely-distributed Indian species were provisionally identified.

*LUTIANUS JOHNII*, Bloch.

*MANDUS MARMORATUS*, Cuv. and Val.

*SILLAGO SIHAMA*, Bloch. Lake Bombon.

*POLYNEMUS TETRADACTYLUS*, Shaw.

*PLATYCEPHALUS INSIDIATOR*, Forskal.

*OTOLITHUS ARGENTUS*, Kuhl and van Hasselt.

*PRISTIPOMA COMMERSONI*, Lacép.

*PRISTIPOMA NIGRUM*, Mertens.

*ANABAS SCANDENS*, Daldorf.

*OPHIOCEPHALUS STRIATUS*, Bloch.

*MUGIL CEPHALOTUS*, Cuv. and Val.

*MUGIL CYPRINUS*, Cuv. and Val.

*ELACATE BIVITTATA*, Cuv. and Val.

*CARANX LEPTOLEPIA*, Kuhl and van Hasselt.

*CARANX NIGRIPES*, Cuv. and Val.

*STROMATEUS NIGER*, Bloch. This is the pomfret, a highly prized fish in the Straits of Malacca : in fact the Europeans do not care to consume many others.

*DREPANE PUNCTATA*, Linn.

*PLATAX VESPERTILIO*, Bloch.

*ARIUS THALASSINUS*, Rupp.

*CALIGNEUS BIMACULATUS*, Bloch.

*PLOTOSUS ANGULARIS*, Bloch.

*CLARIAS DUSSUMIERI*, Cuv. and Val. If I am right in this identification this is a common fish in the ditches and streams about Manila, and may be the species which is consumed in such numbers in the Laguna de Bay. It is called by the natives Candolia.

*NOTOPTERUS KAPIBAT*, Lacép.

*MURENEUS CINEREUS*, Forskal.

*HISTIOPHORUS BREVIROSTRIS*, Playfair.

## MOLLUSCA.

This list is meant to include only the freshwater mollusca found within the lake or the river Pansipit.

1. *CYRENA SUB-ORBICULARIS*, Van d. Busch; Philippi, *Abbildungen und Beschr. neuer Conch.* Bd. III. p. 77, pl. II., fig. 1., 1849. A somewhat solid sub-orbicular shell, with a distinct posterior undulation extending from the umbones to the margin. It is covered with an olive-green, shining, neat periostraca, which projects in concentric asperities along the lines of growth, which are crowded. It is not much eroded, and has altogether a cleaner appearance than most members of the genus. Very common in all the ditches and stagnant waters about Manila, Laguna de Bay, &c.

2. *CORBICULA CROSSEANA*, Petit. A small tumid shell with regular rounded sulcations, covered with a brownish olive periostraca, underneath which the shell is purple, especially at the umbones, where it is eroded. The transverse ribs between the sulci are rounded. The enormous quantities of this mollusk are indescribable. Along the river Pasig there are duck farms extending for many miles on both banks, and maintaining hundreds of thousands of ducks. They are almost entirely fed on the river mollusca, and principally on this *Corbicula*. At Los Baños, in the Laguna de Bay, where the boiling springs from Maquilin empty themselves into the lake, there are large heaps of these shells destroyed by the hot water, together with a *Pahudina* to be mentioned presently. The lake mollusks are also sold in the markets as food for fowls. They are brought down in bags by the passenger steamers which ply upon the lake. Nevertheless, there seems no diminution of the supply; in fact, this continued clearing off of the surplusage would seem to have a happy effect in giving room for the fullest development of the young mollusks. I have been informed that the supply, if anything, is increasing.

3. *NERITINA DUBIA*, Chemnitz, V. 324, figs. 2019 and 2020, and (according to Wood's Index Testaceologicus) *N. dubiosa*, 244; *N. Philippinarum*, Sowerby; *N. reticulata*, Quoy; *N. subreidis*, Lesson, teste Récluz. This *Neritina* varies between shining black with minute yellow spots or yellow zigzag diagonal markings, and a distinctly banded form of a great variety of patterns and colours, such as yellow and black, yellow and red, and in the centre of the red lines a black band with minute chevrons. There are also black and white shells of a broad zebra pattern. The aperture is obliquely produced, the columella is broadly enamelled with white, and furnished with minute teeth. The operculum of one large spiral like an argonaut shell with a central ridge, rugose lines of growth and no granulations. On the inner side it is polished, has a broad ridge which terminates spirally in two prominently projecting claws. Found abundantly in one place only on the sands at the exit of the river Pansipit.

besides having numerous granular sulci all over the shell. There is an unmistakable figure of this little species in Wood's Index Testaceologicus, Pl. 34, Fig. 131, Hanley's Edition, London, 1856. The species is common throughout the rivers and streams of the Philippines.

6. *MELANIA FUSCATA*, Born. A narrow subulate species of ten whorls, obsolete tubercular at the upper portions of the spire. Whorls 10, with a thick blackish-olive periostraca, with rusty erosions; mouth white; outer lip very sinuous.

There are many other fluviatile species to be found in connection with the river and lake of the volcano, but these are all I succeeded in recognizing. The estuarine shells, unfortunately, became mingled with collections from other portions of the islands, but as well as I can remember, I only succeeded in procuring few species, one of which is certainly *Auricula auris midae*.

## LAND MOLLUSCA.

One or two shells of the genera *Helix* and *Bulimus* were found on the volcano of Taal, the *Helix* being possibly a variety of the large *H. maxima*. The extraordinary richness of these islands in *Helicidae* is well known. They are inferior in number only to those of Lusitania and the Antilles, and vastly superior in size and beauty of colouring. The *Cyclostomidae* are probably equal in number to those of India. Nearly all the species are confined to particular islands, but the form and colouring vary but slightly, so that possibly they are no more than local varieties (Dr. Woodward).

The *Bulimi* of the Philippine Islands, which are very numerous and of large size, chiefly belong to one type, represented by *B. pythagasta*, Fer., *B. bicoloratus*, Lea, *B. lignarius*, Pfr., *B. fulgetrum*, Brod., *B. nimbosus*, Brod., and others. The shells



of this type are not so much distinguished by colour as by the presence of a double membranaceous periostraca, to which the different species are indebted for their characteristic patterns. *B. cumingii*, Pfr., and *B. loati*, Pfr., and a few others belong to another type. In this the shell is inflated, mostly shining white with only a very thin single periostraca. About 80 species have been collected, each, with the exception of about half a dozen, confined to its particular island. Some live on the branches of trees, but a few, such as *B. elongatulus*, Pfr., and *B. panayensis*, Pfr., burrow underground. These are transparent and horny (Reeve Elem. Conch. 1860). I found a very great resemblance in type between the Philippine land shells and those of Borneo.

---

## EXPLANATION OF PLATES

# A CONTRIBUTION TO THE HERPETOLOGY OF QUEENSLAND.

By C. W. DE Vis, M.A.

The following lizards are thought to have escaped observation hitherto.

## GECKONIDÆ.

### ÆDURA MONILIS.

Habit slender, elongate. Head much depressed, rather narrow; snout longer than the postorbital region of the head, rather narrow and acute, twice the diameter of the eye. Ear orifice large, oval, horizontal, two-thirds the diameter of the eye. Limbs weak. Scales of the body above and below equal, large, one-fourth of the diameter of the eye, flat, hexagonal; of the vertex similar; of the snout larger. Rostral oblong with its upper angles truncated and with a median cleft above; nasal and mental as in *Æ. tryoni*; labials  $\frac{10}{10}$ . Tail subcylindrical, a little swollen in the middle, with a single small basal tubercle; no preanal pores. Above pale brown with eight pairs of large round well-defined paler spots on the vertebral line, the last two pairs over the pelvis; a series of smaller obscure spots on the dorso-lateral line.

Total length	... 125 mm.	Fore limb	... 18·5 mm.
Head, length	... 19	Hind limb	... 23
Head, width	... 14	Tail	... 47
Body	... 59		

The slender habit, weak limbs, large ear orifice, equal-sized scales and well-marked colouring tend to show that this is more than a variety of *Æ. tryoni*.

### ÆDURA CINCTA.

Dorsals flat, as large as the ventrals; no noteworthy differences from *Æ. marmorata* and *Æ. tryoni* in the rostral (save that the

rostral cleft is complete), nasal, labials, body, limbs and digits; nor from *C. tryoni* in the mental. From the latter species it is thus distinguished: the scales of the head are as large as or larger than the dorsals, flat, sub-equal, roundish or oval; the dorsals are one-seventh of the diameter of the eye; preanal pores in the male 16-21; tail fusiform, arched above, more or less flattened below, constricted beneath behind the base; the basal portion much swollen in the male and having one or two small tubercles on each side. Colouring a reappearance of the family pattern, dark vinous brown above with five pale cross bands, the anterior ones curving forward, that behind the occiput continued over the ear to the gape, the bands more or less dark-centred and white-edged; the broader interspaces and the top of the head more or less pale spotted; the dark ground colour passes as a band through the eye to the snout. In the young the colours are more contrasted and their limits better defined. The cross-bands may be reduced to pairs of oblong spots on the vertebral line.

Total length ... 130 mm. Fore limb ... 22.5 mm

largest on centre of supraorbital region and on the snout; a few small isolated spines behind the tympanum, before it a line of thick cuneiform scales, and between this and the eye a second line. Gulars rhomboidal, smooth, smaller than ventrals, which also are smooth. Dorsals smooth, as large as ventrals, with a median line and scattered number of enlarged flat smooth scales, becoming on the sides thicker and sub-mucronate. Caudals above and below and scales of the limbs sharply keeled and subspinose. A series of 18 or 19 pores extending the whole length of the thigh, interrupted opposite vent. Brown or yellowish-white, densely reticulated with black or brown, the reticulations wider on the occiput. Tail with a series of dark rings above.

Total length	... 101.5 mm.	Fore limb...	... 34 mm.
Head, length	... 24	Hind limb	... 54
Head, width	... 21	Tail	... 103
Body	... 74.5		

*Loc.*—Central Queensland (collected by Mr. C. W. de Burgh Birch).

Separated from *G. reticulatus*, to which it has a strong general resemblance, on account of its enlarged supra-orbitals and reduced number of preanal and femoral pores.

#### VARANIDÆ.

A *Varanus* from the Herbert Gorge corresponds so closely in structural characters with *V. acanthurus*, Blgr., that, so far as they are concerned, it is impossible to separate it. Yet the colouring, a mere dark vermiculation on a brown ground, is so entirely different from that of *V. acanthurus*, that it is difficult to believe it to be the same lizard.

#### SCINCIDÆ.

##### EGERNINA.

##### EGERNIA LAUTA, n. sp.

No distinct postnarial groove, a subnarial suture. Nasals forming a median suture; prefrontals likewise; frontal nearly twice as long as broad; much larger than the interparietal; five

supraoculars, the second largest; eight supraciliaries; a complete series of infraoculars; fifth and sixth upper labials subocular; three large temporals; three pairs of nuchals. Ear orifice shorter than eyelids, oval, with two large lobules anteriorly. Scales in 38 rows, dorsals striated, caudals more strongly so, laterals considerably the smallest. The ends of the adpressed limbs far apart. Tail cylindrical, nearly twice as long as head and body. Yellowish-olive above, with oblong spots of black forming interrupted longitudinal lines, alternating with lines of diamond-shaped yellow spots; on the tail the black lines are continuous, the yellow markings obsolete; a broad black streak below the eye to the ear, another on the edge of each jaw; sides of neck black, fretted with yellow; of body, marbled and streaked with yellow and black; beneath olive.

Total length	... 305 mm.	Fore limb	... 28 mm.
Head, length	... 27.5	Hind limb	... 38
Head, width	... 17.5	Tail	... 195
Body	... 82.5		

posteriorly. Nearly uniform blackish-brown above, the upper angle of each dorsal scale black, forming in sequence longitudinal lines; beneath yellow.

Total length	... 665 mm.	Fore limb	... 78 mm.
Head, length	... 52	Hind limb	... 110
Head, width	... 46	Tail	... 368
Body ..	... 189		

*Loc.*—S. Queensland.

Aboriginal name "bungan." Grows to a much larger size than *E. major*; and, unlike its affine in structural characters, *E. striolata*, inhabits the mountain scrubs in the neighbourhood of Brisbane, *E. striolata* affecting low grounds in the vicinity of water.

#### EGERNIA RUGOSA.

Head moderate; a postnarial groove. Frontonasal in contact with the rostral; prefrontals forming a long median suture; frontal twice as long as broad, much longer than the frontoparietal, narrower than the second supraocular; head-shields thick, rugose, the hinder shields much subdivided; four supraoculars, the upper third of the third separated; frontoparietals distinct, each obliquely subdivided; interparietal nearly as large as the frontal, partially subdivided transversely, with a broad posterior edge and conspicuous ocellus; parietals in four and six subdivisions, followed by an irregular row of occipitals, and these by two pairs of enlarged nuchals; three rows of temporals, the anterior largest; supra-ciliaries five, the second largest, the first and second on one side subdivided; four or five infraoculars, the first largest and breaking joint with the fourth and fifth upper labials. Ear orifice as long as the eyelids, much concealed by three rhomboidal lobules. Scales thick, in 26 rows; dorsals obtusely quadricarinate, the four median rows subequal; laterals much smaller than the ventrals, posterior laterals obscurely pluricarinate. The adpressed limbs overlap; digits moderate. Tail cylindrical, considerably shorter than head and body; upper scales of the base keeled as the dorsals. Above uniform brown, on the sides paler and varied with yellowish scales; beneath yellowish, chin and throat with broad black spots.

Total length ...	321 mm.	Fore limb ...	34.5 mm.
Head, length ...	28	Hind limb ...	42.5
Head, width ...	22	Tail ...	99
Body, length ...	94		

*Loc.*—Herbert Gorge, (collected by Mr. K. Broadbent).

Resembles in many features *E. dorsalis*, Peters, but, apart from the ruggedness of the head shields, it differs in having a longer head and limbs, and a shorter tail.

#### TILQUINA.

##### TILQUA LONGICAUDA.

No postnarial groove. Rostral in contact with frontonasal; prefrontals forming a long median suture; interparietal narrower than the parietals; parietals widely separated posteriorly by the anterior occipitals, which are enlarged and triangular, and are followed by two or three pairs of occipitals much broader than long; four supraoculars; five supraciliaries; temporals subequal. Ear orifice shorter than the eyelids, without lobules.

## LYGOSOMINA.

## HINULIA TIGRINA.

Habit slender. Head narrow ; snout long, deep, and rounded. Length anterior to axil once and one-eighth in the distance between the limbs. Rostral elevated, forming a straight suture with the frontonasal ; the latter much broader than long, with an angular posterior edge ; prefrontals forming together a long median suture ; frontal nearly as long as fronto- and interparietals together ; the last as long as the frontoparietals ; parietals meeting behind the interparietal, bordered by two pairs of scales and two temporals ; no nuchals ; four supraoculars, the first much the longest ; first and second in contact with frontal. Seven supraciliaries ; a single anterior loreal ; fifth supralabial subocular. Ear orifice three-fifths as long as eyelids, without lobules. Scales in 29 rows, laterals smallest, dorsals, especially two median rows, larger than ventrals, a pair of enlarged preanals. On adpression the fourth toe reaches the wrist ; subdigital lamellæ 26. Above coppery-brown, with a brighter dorsolateral edge from which proceed short narrow transverse bars, broken up on the back into irregularly transverse streaks ; on the sides irregularly undulating fretted bands descending obliquely forwards from the dorsolateral edge—the line of markings resulting from the junction of these with the dorsal bars extends forwards to the eye.

Total length	... 9 mm.	Fore limb	... 19 mm.
Head, length	... 16	Hind limb	... 29
Head, width	... 9.5	Tail (reproduced)	
Body, length	... 51		

*Loc.*—Geraldton, (collected by Dr. Bancroft).

In synoptical characters this species has its nearest ally in the Papuan *M. Maindroni*, Sauv.

## HINULIA AMBIGUA.

Habit rather stout ; limbs moderate ; length anterior to forelimb four-fifths of the distance between the limbs. Snout short, rounded ; a single nasal ; frontonasal broader than long, forming



a narrow suture with the rostral, a broader one with the frontal; frontal as long as fronto- and interparietals together; these shields distinct, subequal; four supracoculars on one side, five on the other, the two or the three anterior in contact with the frontal; nine supraciliaries on one side, eight on the other; parietals in contact posteriorly, bordered by two pairs of scales and a temporal; no enlarged nuchals; anterior loreal single on one side, double on the other; fifth and sixth supralabials subocular. Ear orifice oval, two-thirds as long as the eyelids, with three minute granules on one side, none on the other. Scales in 32 rows, all smooth; dorsals equal, laterals smallest; a pair of much enlarged preanals. The adpressed limbs overlap; digits rather short; fourth toe with 23 lamellæ. Tail of moderate thickness. Pale brown above, with nine darker crossbands nearly as broad as the intervals; about 27 on the tail; beneath buffy white.

Total length	... 132 mm.	Fore limb	... 14 mm.
Head, length	... 12	Hind limb	... 20
Head, width	... 7	Tail	... 80

enlarged preanals. The adpressed hind limb reaches the elbow; digits long, compressed; subdigital lamellæ 22. Brown above, with a few scattered dark spots on the back; a series of larger spots on the dorsolateral line; sides with indistinct bands of spots descending vertically from the dorsolateral line; lips with blackish spots or short bars.

Head, length ... 15 mm.

Fore limb ... 21.5 mm.

Head, width ... 9

Hind limb ... 27

Body, length ... 51.5

Tail reproduced.

*Loc.*—Queensland.

In a synoptical view this species stands next to *H. tenuis*, but is perhaps more closely allied to *H. elegantula*, from which it differs in the following points:—relative shortness of head and neck, separation of prefrontals, absence of nuchals, greater length of limbs and digits.

#### MOCOA SPECTABILIS.

Habit slender, elongate; snout rather elongate, rounded. Length anterior to fore limb more than two-thirds of the distance between the limbs. Nasal lateral, nostril subcentral; frontonasal broader than long, in contact with the rostral (the suture being as broad as the frontal), and by a rather narrow suture with the frontal; frontal longer than broad, as long as the fronto- and interparietals together; these three shields distinct, subequal; four supraoculars, the second largest, but rather shorter than the third, first and second in contact with frontal; parietals forming a short suture behind the interparietal, followed by a pair of nuchals; seven supraciliaries; fourth upper labial largest and subocular; palpebral disc occupying middle third of the eyelid. Ear orifice rounded, shorter than the palpebral disc. Scales in 22 rows, smooth, laterals smallest, median pair of dorsals sometimes distinctly enlarged. The adpressed limbs overlap or hardly meet; digits rather short; fourth toe with 20 to 24 more or less divided lamellæ. Tail moderately thick, not half as long again as head and body. Rich buffy or bronzy brown above, uniform or with scattered black angular spots, which are

larger, and form a line on the dorsolateral edge; some of the scales paler, and on the upper surface of the tail forming a more or less regular series of pairs of pale spots; sides with or without oblique streaks of dark brown; a dark brown line from the snout through the eye to the neck; beneath pale brown; a white streak on the hinder basal surface of thigh; dorsal scales with four or five pigment streaks.

Total length	... 134 mm.	Fore limb	... 10.5 mm.
Head, length	... 10.5	Hind limb	... 18
Head, width	... 6	Tail	... 81.5
Body	... 42		

*Loc.*—Gympie.

Differs from *H. mustelina*, O'Shaugh., in its proportions and style of colouring, and in the greater number of lamellæ under the fourth toe.

#### MOCOA DELICATA.

Habit slender; snout short, obtuse, depressed. Rostral low; nasofrontal much broader than long, forming a straight broad snout, with the rostral and prefrontal one with the fronto-

*Loc.*—Warro, Central Queensland, (collected by Mr. Blackman).

But for its enlarged preanals, would be comparable with *M. guichenoti*, but on direct comparison its slenderer form, feebler limbs, and entirely different physiognomy shew that its affinity to *guichenoti* is by no means close.

#### HETEROPUS VERTEBRALIS.

Habit stout. Snout moderately short, rounded; the length anterior to the fore leg is contained once or once and a seventh in the distance between the limbs. Frontonasal broader than long, forming a long suture with the rostral; frontal as long as the frontoparietal; prefrontals nearly in mutual contact or forming a long intersuture; interparietal distinct, moderately small; four supraculars, first longer than the second; seven supraciliaries; parietals forming an intersuture posteriorly; fifth or sixth upper labial subocular. Ear orifice smaller than palpebral disk, with a complete fringe of small pointed lobules or only a few anteriorly. Scales in 38 or 40 rows; dorsals bi- tri- or quadricarinate; laterals bicarinate and smallest. Digits moderate; 23 lamellæ under the fourth toe. Preanals slightly enlarged. Tail cylindrical, tapering, shorter than head and body. The adpressed hind limb reaches the wrist or beyond. Dark olive grey above with longitudinal rows of blackish mottlings, between which the paler ground colour forms a vertebral, and a pair of sublateral lines on the back: beneath white, passing suddenly into the dark hue of the upper surface.

Total length	...	118 mm.	Fore limb	...	17 mm.
Head, length	...	13·5	Hind limb	...	22
Head, width	...	9·5	Tail	...	69
Body, length	...	36·5			

*Loc.*—Chinchilla, Darling Downs.

Differs from *H. fuscus* in proportions, style of colouring, number of subdigital lamellæ, &c.

*Heteropus rostralis*  
*H. rhomboidalis*, Pet  
*H. rostralis* has the  
*Heteropus bicarin*  
not infrequent at H

*Heteropus peronii*  
must lose the duplic  
distinct. *Myophila*  
naked-eyed scinc. A  
description given l.c.  
*soma blackmanni* or .

The following key  
Palpebral disc not la  
Interparietal distin  
Dorsals tri-or qu  
Toes cylindi  
Toes compre  
Dorsals bicarina  
No interparietal....  
Palpebral disc larger  
Dorsals sharply h  
Dorsals bica.  
Dorsals trica  
First supra  
First ....

**ANOMALOPUS LENTIGINOSUS.**


Hind limb minute, undivided; fore limb a little longer, didactyle. Snout moderate, rounded. Lower eyelid scaly. Nostril in antero-inferior quarter of a large nasal. Rostral produced between the nasals, in contact with the fronto-nasal, which is much broader than long, and forms a broad suture with the frontal; frontal nearly as broad as long, broader than the supraoculars, shorter than the fronto- and interparietals together, and in contact with two supraoculars; four supraoculars; five supraciliaries; fronto-parietals distinct, equal in size to interparietal; parietals forming a suture behind interparietal; no enlarged nuchal; four large suboculars. Ear hidden. Scales in 20 rows, smooth, dorsals largest, a pair of enlarged preanals. Tail thick, longer than head and body. Pale reddish-brown, paler brown beneath, uniform or with the sides and under-surface of tail freckled with minute brown spots; a trace of a pale band across the occiput conspicuous in the young.

Total length	... 198 mm.	Fore limb	... 2.5 mm.
Head, length	... 9.5	Hind limb	... 1.5
Head, width	... 5.5	Tail	... 10.3
Body, length	... 84.5		

*Loc.*—Brisbane.

**OPHIOSCINCUS FRONTALIS.**

Snout elongate, conical, subacute. Rostral elevated, in contact with frontonasal; nostril in the lower angle of the nasal. Pre-frontals nearly or quite in contact with each other; frontal longer than or as long as broad, forming a suture with the first supraciliary and first supraocular; fronto- and interparietals distinct, the latter rather the larger; four supraciliaries; parietals meeting behind interparietal, bordered laterally by a pair of temporals; no enlarged nuchals. Ear hidden. Eyelids as long as first labial. Scales in 30 rows, smooth; ventrals and laterals subequal; a pair of enlarged preanals. Tail thick, obtusely pointed. Ashy-grey or reddish-grey above; yellowish beneath, the colours more or less



Habit elongate, sl  
moderate, conical, ro  
two or three on th  
behind the rostral ; f  
as the frontal ; the la  
together ; frontoparie  
small, widely separa  
parietal ; two or th  
ciliaries, the penultim  
minate or quite clo  
largest. Tail longer  
brown above, each dor  
edged above with a l  
eye to the snout ; ben

Total length ...

Head, length ...

Head, width ...

Body ... ..

*Loc.*—Charleville.

broad; posterior angle of frontal a rectangle; parietals larger than or about equal in size with the frontal; two successive band-like scales on the oblique hinder edge of each parietal; two large supraorbitals separated from the eyelid by two enlarged supraciliaries; five supralabials, the third elongate and subocular; four infralabials, the anterior pair meeting below in a suture. Scales in 12 rows. Abdominal scutes twice as broad as long, in 48-55 pairs; no preanal pores; a smaller median scale wedged in between the enlarged preanals. Snout obtuse, shorter than the postorbital portion of the head; canthus rostralis very obtuse. Ear orifice small, considerably shorter than the eye, oblique, elliptical. Tail long, more than three times as long as the head and body. Olive suffused with salmon colour, in spirits fading to yellowish, and deeply staining the liquor; upper surface of head and neck black, interrupted by four yellow bands, one occupying the muzzle, the second before the eye, the third behind the eye, the fourth across the occiput, a fifth separates the colours of the head and body; the anterior divisions of the black ground colour descend on the lower lip; beneath salmon colour, passing into yellow.

Length of head	...	...	...	6 mm.
Body	...	...	...	31
Tail ...	...	...	...	136

*Loc.*—Normanton, Gulf of Carpentaria; Springsure, Central Queensland.

#### DELMA PLEBEIA.

Rostral triangular or subpentagonal; nostril between the first supralabial and three nasals; two pairs of supranasals forming a median suture; frontonasals large, descending on the face; loreal large, in contact above with the prefrontal, which is larger than the frontal, seven-sided, as broad as long; frontal seven-sided, as broad as long, smaller than the parietals, between which it enters posteriorly; parietals with three large scales on the lateral edges; two supraorbitals; a circumorbital ring of which the two or three supraciliaries are enlarged, and separate the supraorbitals



from the granular eyelid; a series of four small scales between the postnasal and the orbit; seven supralabials, of which the fourth generally, the third occasionally, is elongate and subocular; five lower labials, the three anterior very large, the first generally meeting its fellow in a suture beneath; mental larger than rostral, triangular. Snout obtuse, shorter than the distance of the eye from the hinder edge of the ear orifice; canthus rostralis very obtuse. Ear orifice small, shorter than the diameter of the eye, elliptical, oblique. Tail moderate,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times as long as the head and body. Rudimentary hind limb shorter than the snout. No preanal pores; no median preanal scale. Scales in 14 rows, occasionally 16; abdominal scales 50-55, generally 53. Above olive, scales frequently dark-edged, giving the skin a reticulated appearance; the banded markings of the head represented in adults by a pair of dark blotches on each lip, and occasional dark spots or faint traces of a bar across the occiput; beneath yellowish anteriorly, salmon colour for the greater part posteriorly. Young subjects have sometimes the dark grey and pale barring of the

DESCRIPTIONS OF NEW AUSTRALIAN  
*RHOPALOCERA*.

By E. MEYRICK, B.A., F.E.S.

LYCAENIDAE.

*Polyommatus*, Latr.

I use this name in the sense in which it is employed by Staudinger in his Catalogue, to denote the genus formerly known as *Chrysophanus*, distinguished from *Lycaena* by the smooth eyes (not hairy); there are several blue Australian species which have been confounded with *Lycaena*.

*Pol. uranites*, n. sp.

♂♀. 26-28 mm. Head orange, margins more or less grey, orbital rims white. Palpi white, towards apex dark fuscous. Antennæ black, annulated with white. Thorax and abdomen grey. Forewings with costa almost straight, hind margin in ♂ almost straight, little oblique, in ♀ rounded towards anal angle; in ♂ brilliant light brassy-blue, in ♀ purple-blue; a narrow costal and broad hindmarginal dark fuscous border, latter occupying nearly half wing on costa, and gradually diminishing to anal angle; in ♀ an irregular orange-reddish streak almost along hindmargin: cilia white, barred with dark fuscous, basal third dark fuscous. Hindwings with hindmargin somewhat waved, rounded more strongly in ♀; colour and markings as in forewings, but hindmarginal border only descending to middle of hindmargin; a

reddish-orange almost marginal streak, tending to form spots, along hindmargin in both sexes. Forewings beneath bright yellow-ochreous, suffused with reddish-orange between posterior markings; upper half with seven irregular trapezoidal pale bluish-golden spots arranged in four transverse series (1, 1, 2, 3), laterally black-margined; dorsal third grey, except a light orange spot before middle; three roundish blackish spots before hindmargin on lower half. Hindwings beneath bright yellow-ochreous, somewhat spotted with reddish-orange between markings; three strongly curved series of moderate irregular trapezoidal more or less confluent pale bluish-golden spots, first two interrupted near costa.

Geraldton, West Australia, in October and November; common. This is one of the finest species of the genus.

*Pol. cyanites*, n. sp.

## HESPERIADAE.

## TELESTO, Boisd.

*Tel. crypsargyra*, n. sp.

♂♀. 26-29 mm. Head black, spotted with pale yellow. Palpi pale yellow, apex black. Antennæ black, beneath spotted with pale yellow. Thorax with mixed black and pale yellow hairs. Abdomen black, segmental margins pale yellow. Forewings with costa nearly straight, hindmargin rounded, slightly oblique; dark fuscous; some yellowish hairs towards base; spots light ochreous-yellowish, thinly scaled; one in middle of disc, moderate, irregular; three very small, subconfluent, in transverse row beneath costa at  $\frac{2}{3}$ ; one small, subquadrate, between veins 3 and 4 at base, beneath which is in ♂ a minute dot, in ♀ a rather larger adjacent similar spot; in ♂ a straight dull blackish streak from disc beyond middle to  $\frac{2}{3}$  of inner margin; in ♀ a very small yellow spot near inner margin before middle, and a larger one at  $\frac{2}{3}$ : cilia dark fuscous, terminal half sometimes obscurely spotted with pale yellowish. Hindwings with hindmargin rounded; blackish-fuscous; a moderate transverse fascia-like orange-yellow blotch in middle of disc, narrowed and less defined beneath, not nearly reaching costa or inner margin; cilia blackish, unevenly barred with yellow. Forewings beneath dark fuscous; spots as above, with a yellowish suffusion beneath costa on basal half, a small yellow spot on costa at  $\frac{1}{3}$ , a yellow bar before hindmargin from costa to vein 4, and an interrupted yellow hindmarginal line. Hindwings beneath dark fuscous, more or less ferruginous-tinged; veins partially lined with yellowish; an oblique pale yellowish blotch from costa near base; ten snow-white spots; first small, beneath middle of costa; second longitudinal-linear, in disc before middle; third irregular wedge-shaped, beneath disc before middle; fourth moderately large, trapezoidal, in middle of disc;

fifth suboval, beneath costa before apex ; remaining five rather small, forming a submarginal series, two upper smallest and sometimes confluent.

Blackheath (3,500 feet), New South Wales ; locally common, in November and February. One of the handsomest and most distinct species of the genus, but I have never met with it elsewhere, nor seen it in other collections.

*Tel. chaostola*, n. sp.

♂. 31 mm. Head, palpi, thorax, and abdomen fuscous-grey. palpi becoming whitish beneath, hairs of abdomen yellowish-tinged. Antennæ black, annulated with white. Forewings with costa nearly straight, hindmargin rounded, somewhat oblique ; dark ochreous-fuscous, towards base with yellowish hairs ; a slender ochreous-whitish line immediately beneath costal edge on basal half ; spots light ochreous-yellowish, thinly scaled, one in

purplish-tinged, irregularly sprinkled with grey-whitish, dorsal half suffused with grey-whitish except near hindmargin; a twice dentate dark purple-fuscous mark towards inner margin before middle; eight indistinct moderate spots outlined with dark purple-fuscous; one before and above middle, one smaller in middle, remaining six forming a series (lower three adjacent) parallel to hindmargin at  $\frac{2}{3}$ ; a series of obscure irregular dark purple-fuscous marks beyond this.

Blackheath (3,500 feet), New South Wales, in November; one specimen received from Mr. G. H. Raynor, who has others.

*Tel. dactyliota*, n. sp.

♂♀. 25-33 mm. Head, palpi, thorax, and abdomen fuscous-grey; palpi whitish beneath; hairs of abdomen yellowish-tinged. Antennæ black, slenderly annulated with white. Forewings with costa almost straight, hindmargin rounded, rather oblique; rather dark fuscous, in ♂ ochreous-shining; basal third with pale ochreous-yellowish hairs; spots pale whitish-yellowish, thinly scaled, in ♂ very small, in ♀ moderate; first in middle of disc, transverse; second between veins 3 and 4 at base, roundish, in ♀ with an additional larger spot adjacent to it beneath; three adjacent, arranged in a transverse series beneath costa at  $\frac{2}{3}$ ; two others obliquely beneath and beyond them; in ♂ a strong blackish streak from lower angle of first spot to beyond middle of inner margin: cilia grey-whitish, basal half barred with grey. Hindwings with hindmargin rounded; ground-colour and cilia as in forewings; dorsal half clothed with pale ochreous-yellowish hairs; a pale ochreous-yellowish cloudy longitudinal-oval discal blotch, beneath and beyond which are several very obscure cloudy pale ochreous-yellowish spots, in ♂ tending to form a posterior transverse series. Forewings beneath dark fuscous; an obscure yellowish suffusion beneath costa on basal half; a triangular blotch suffused with whitish-grey, occupying apical fourth of wing; spots as above, but in ♂ with an additional spot beneath posterior

discal spot, as in ♀. Hindwings beneath light grey, mixed with fuscous towards costa; spots round, outlined with dark fuscous; one very small beneath costa at  $\frac{1}{3}$ , and a similar one in disc before middle; two dot-like, towards inner margin before middle; seven moderately large, placed in an acutely angulated post-median transverse series.

Port Lincoln, South Australia; Geraldton, West Australia; in October and November, common.

*Tel. megalopia*, n. sp.

♀. 34 mm. Head blackish, spotted with yellow-whitish. Palpi yellow-whitish, apex blackish. Antennae black, spotted with white beneath. Thorax and abdomen fuscous, somewhat mixed with yellow-whitish. Forewings with costa straight, hindmargin almost straight, rather oblique; dark fuscous, posterior half rather lighter; spots shining whitish-ochreous, thinly scaled; first moderate, irregular, in middle of disc; second moderate, subtriangular, between veins 3 and 4 at base, nearly approaching first; third large, trapezoidal, placed beneath first and second and only separated by a dark vein; a cloudy roundish more yellowish-tinged spot beneath anterior angle of this; a cloudy yellowish streak along middle third of inner margin; three small oblong sub-confluent spots placed in a transverse series beneath costa at  $\frac{1}{3}$ ; cilia fuscous, terminal half grey whitish. Hindwings with hindmargin rounded; dark fuscous; dorsal half with yellowish hairs; a moderately large subquadrate pale whitish-ochreous spot in disc beyond and somewhat above middle; a cloudy light ochreous-yellowish suffusion beneath anterior angle of this. cilia fuscous, terminal half grey-whitish. Forewings beneath with colour and markings as above, but lighter. Hindwings beneath rather light fuscous, towards inner margin somewhat suffused with whitish-ochreous; a small round white spot in middle of disc, surrounded by a thick black ring, outside which is a narrow pale whitish-ochreous suffusion which is dilated into a moderately large spot on posterior side.

Gayndah, Queensland; one specimen received from Mr. G. Masters, who has others.

*EXOMETOECA*, n. g.

Characters quite as in *Telesto*, except that vein 5 of the hindwings is present as a perfect vein (in *Telesto* represented only by an imperfect fold).

This genus is not closely allied to any Australian form; the peculiar position of the wings in repose is worthy of notice.

*Ex. nycteris*, n. sp.

♂. 27 mm. Head, palpi, thorax, and abdomen yellow-ochreous; palpi whitish on lower half. Antennae grey, club becoming crimson above. Forewings with costa almost straight, hindmargin hardly rounded, somewhat oblique; rather deep yellow-ochreous, towards costa posteriorly fuscous-tinged; costal edge fuscous; a small dark fuscous longitudinal spot at base near inner margin; a dark fuscous transverse linear mark in disc above middle; a cloudy fuscous dot beneath vein 2 before middle; two very small white spots, margined with dark fuscous, placed transversely in disc at  $\frac{2}{3}$ , upper between veins 3 and 4 at base; two dark fuscous dots placed transversely beneath lower of these; three very small white adjacent spots placed transversely beneath costa at  $\frac{2}{3}$ , margined posteriorly by a dark fuscous line somewhat produced beneath: cilia fuscous, mixed with ochreous-yellowish, becoming wholly yellow-ochreous towards anal angle. Hindwings with hindmargin rounded; yellow-ochreous, posteriorly fuscous-tinged, costal third wholly rather dark fuscous; a cloudy fuscous transverse mark in disc before middle; a curved transverse row of five very small round cloudy dark fuscous spots at  $\frac{2}{3}$ , extending from near costa to below middle; cilia fuscous, mixed with ochreous-yellowish, round apex darker fuscous. Forewings beneath fuscous, dorsal third pale whitish-ochreous; white spots as above; a whitish transverse discal mark, margined with dark fuscous; a



- |   |                          |
|---|--------------------------|
| 5. Forewings with vein 11 rising out of 9 .....                       | 6.                       |
| Forewings with vein 11 rising separate .....                          | 7.                       |
| 6. Forewings with vein 6 rising out of 9.....                         | 8. <i>Comostola</i> .    |
| Forewings with vein 6 widely remote.....                              | 1. <i>Perizera</i> , a.  |
| 7. Posterior tibiae in ♂ without middle-spurs ...                     | 8.                       |
| Posterior tibiae in ♂ with middle-spurs .....                         | 10.                      |
| 8. Terminal joint of palpi extremely long .. ...                      | 1. <i>Perizera</i> , b.  |
| Terminal joint of palpi short or moderate ...                         | 9.                       |
| 9. Forewings with vein 11 anastomosing with 10 ...                    | 12. <i>Crypsiphona</i> . |
| Forewings with vein 11 not anastomosing<br>with 10.....               | 7. <i>Eucrostis</i> .    |
| 10. Forewings with vein 11 connected with 9<br>only, below 10 .....   | 5. <i>Timandra</i> .     |
| Forewings with vein 11 not connected with<br>9 only, below 10 .....   | 11.                      |
| 11. Hindwings with veins 6 and 7 stalked, palpi<br>smooth above ..... | 9. <i>Iodis</i> .        |
| Hindwings with veins 6 and 7 separate .....                           |                          |

filiform, in ♀ somewhat thickened with scales towards base. Posterior femora in ♂ with dense brush of long hairs above, tibiae in ♂ with median spurs absent, in ♀ all spurs present. Forewings with vein 6 widely remote from 9, 10 out of 9, 11 anastomosing with or rising out of 9 above 7. Hindwings with veins 3 and 4 from a point or closely approximated, 6 and 7 separate or short-stalked.

Besides the following, I have described two species from the South Pacific islands; although closely allied to the Australian, these differ in the less remarkably elongate palpi, and in vein 11 of the forewings rising out of 9, instead of rising separately and anastomosing with it: but there can be no question of their generic identity.

1. *Per. porphyropis*, n. sp.

♀. 29-32 mm. Head, palpi, antennae, thorax, abdomen, and legs whitish-ochreous; upper half of face fuscous-crimson; palpi very long, fuscous-crimson above; abdomen with two blackish dorsal dots towards base, two fuscous-crimson dots towards middle; anterior and middle legs fuscous-crimson above. Forewings with costa slightly arched, hindmargin slightly sinuate beneath apex, rather obliquely rounded, waved; vein 11 anastomosing with 9; whitish-ochreous, irregularly irrorated with pale greyish-ochreous; a black basal dot, two beneath costa at  $\frac{1}{6}$  and  $\frac{1}{4}$ , and one above inner margin at  $\frac{1}{4}$ ; a very small dark reddish-fuscous discal spot; a somewhat curved series of blackish dots on veins from  $\frac{1}{5}$  of costa to  $\frac{3}{4}$  of inner margin, sinuate above middle; a very small blackish spot beneath costa towards apex, and two others above middle, followed by a blackish mark before hindmargin; a hindmarginal series of black dots: cilia whitish-ochreous, with a basal row of fuscous-crimson dots. Hindwings with hindmargin somewhat rounded, crenulate; veins 3 and 4 from a point, 6 and 7 short-stalked; colour and markings as in forewings, but no anterior black dots except one below middle towards base, discal spot moderate, deep ferruginous, containing

a blackish ring, centre purplish; a square patch on anal angle suffusedly spotted with blackish, purplish-tinged.

Var. *a*. All blackish dots changed to fuscous, indistinct; all blackish spots absent.

Newcastle and Sydney, New South Wales; in December, April, and May, three specimens.

## 2. PROBLEPSIS, Ld.

Face smooth. Palpi short, porrected or subascending, slender, with appressed scales, or somewhat rough beneath, terminal joint short. Antennæ in ♂ shortly bipectinated ( $1\frac{1}{2}$ ), pectinations terminating in long fascicles of cilia ( $2\frac{1}{2}$ -3). Thorax with a few hairs beneath. Posterior tibiae in ♂ compressed, without spurs, in ♀ all spurs present; posterior tarsi in ♂ strongly abbreviated. Forewings with veins 3 and 4 separate, 6 remote, 10 out of 9 below 8, 11 connected with 9 at a point below 7. Hindwings with veins 3 and 4 separate, 6 and 7 separate.

ochreous-tinged shade, irregularly margined with silvery-metallic, from discal ring to inner margin beyond middle ; a pale ochreous-tinged outwards-curved shade from  $\frac{2}{3}$  of costa to beyond  $\frac{3}{4}$  of inner margin ; a row of confluent semicircular grey spots beyond and parallel to this ; a faint grey line between these and hindmargin ; a grey hindmarginal line : cilia white, with two faint greyish lines. Hindwings with hindmargin rounded ; white ; a straight grey median shade ; a long transverse-oval irregular silvery-metallic ring lying partly on this in disc, containing a short yellow-ochreous transverse mark in upper half ; posterior markings and cilia as in forewings.

Townsville, Queensland ; one specimen (Coll. Masters). Also from Borneo.

3. *Probl. sancta*, n. sp.

♂♀. 25-29 mm. Head blackish on crown, upper half of face ferruginous, lower half and collar white. Palpi pale ferruginous. Antennæ whitish-ochreous, in ♂ pale ferruginous beneath. Thorax and abdomen white. Legs white, anterior pair light ferruginous above, middle pair ferruginous-tinged. Forewings with costa gently arched, hindmargin rather obliquely rounded ; snow-white ; a transverse suboval blotch in middle of disc, narrowed beneath, consisting of a yellow-ochreous outer ring, an iridescent silvery-metallic inner ring becoming black above, and a white centre ; a very faint pale ochreous or greyish-tinged shade from this blotch to middle of inner margin ; a faint curved whitish-ochreous line from  $\frac{2}{3}$  of costa to  $\frac{3}{4}$  of inner margin ; a series of pale grey spots near beyond this, not reaching costa ; a very faint greyish submarginal line on lower half : cilia snow-white. Hindwings with hindmargin rounded ; white ; a narrow transverse elongate-oval ochreous-yellowish discal spot, margined with iridescent silvery-metallic ; posterior markings as in forewings, but submarginal grey line more distinct and extended further towards costa ; cilia white.

Duaringa, Gayndah, and Rosewood, Queensland ; in December, several specimens.

3. *DITHALAMA*, n. g.

Face smooth. Palpi short, porrected or ascending, with appressed scales, somewhat rough beneath, terminal joint short. Antennae in ♂ dentate, ciliated with fascicles (14). Thorax smooth beneath. Abdomen in ♂ with pencil of long hairs from base beneath. Posterior tibiae in ♂ flattened, distorted, without spurs, in ♀ all spurs present; posterior tarsi in ♂ much aborted. Forewings with veins 3 and 4 separate, 6 remote, 10 anastomosing with 9 above 7, 11 anastomosing with 10 before 9. Hindwings with veins 3 and 4 separate, 6 and 7 stalked.

4. *Dith. cosmospila*, n. sp.

♂♀. 23-24 mm. Head rather dark fuscous, collar and lower margin of face whitish. Palpi fuscous, beneath whitish. Antennae whitish or grey. Thorax whitish, with an obscure brownish-ochreous bar behind middle. Abdomen grey mixed with ferruginous, segmental margins white. Legs whitish, anterior pair infuscated. Forewings with costa posteriorly moderately arched, hindmargin bowed, oblique; very pale greyish-ochreous, basal area suffused with pale reddish-ochreous except towards costa; lines slender, ferruginous mixed with black; first from beneath costa at  $\frac{2}{5}$  to  $\frac{3}{5}$  of inner margin, curved outwards above middle, sinuate inwards below middle; a transverse linear fuscous discal spot, followed by a suffused white patch; second line from beneath costa at  $\frac{1}{3}$  to  $\frac{2}{3}$  of inner margin, rather irregularly dentate, preceded by a whitish suffusion towards costa and inner margin; an irregular dentate-edged narrow fascia-like ferruginous blotch, more or less mixed with black, close beyond second line, extending from rather near costa to below middle, margined by whitish lines which are confluent beneath and continued to inner margin; an interrupted blackish hindmarginal line; cilia very pale greyish-ochreous. Hindwings with hindmargin rounded; ground colour, discal spot, posterior markings, and cilia as in forewings, but

second line angulated towards costa, ferruginous fascia extended to inner margin.

Newcastle and Sydney, New South Wales ; in September and October, not uncommon, appearing to frequent *Eucalyptus*.

#### 4. ACIDALIA, Tr.

Face smooth. Palpi moderate or short, loosely rough-scaled or filiform, porrected or subascending, terminal joint short. Antennæ in ♂ filiform or dentate, ciliated. Posterior tibiae in ♂ often dilated, without spurs or with end-spurs only, in ♀ with all spurs present or sometimes with middle-spurs absent, posterior tarsi in ♂ more or less aborted or rarely well-developed. Forewings with veins 3 and 4 separate, 6 remote from 9, 10 out of 9 below 8, 11 connected by bar or anastomosing with 9. Hindwings with veins 3 and 4 remote, 6 and 7 stalked or separate.

A very large genus, cosmopolitan except for New Zealand, where there is only one Australian species. The species are small, inconspicuous, and often extremely similar, requiring very careful examination. In the following specific descriptions five transverse lines are referred to as normally present ; the first, median, second, subterminal, and submarginal. The length of the posterior tarsi of the ♂ is stated in terms of the length of the tibiae. The palpi are often very variable in colour, and in direction also, within the limits of the same species ; apparently no stress should be laid upon them in this genus.

- |  |                           |
|--|---------------------------|
| 1. Posterior tibiae of ♂ with terminal spurs ... | 2.                        |
| Posterior tibiae of ♂ wholly without spurs...    | 4.                        |
| 2. Thorax suffused with dark grey.....           | 30. <i>episcia</i> .      |
| Thorax ochreous-whitish .....                    | 3.                        |
| 3. Discal dot minute, second line straight ..... | 28. <i>orthoscia</i> .    |
| Discal dot large, second line subsinuate ...     | 29. <i>megalocentra</i> . |
| 4. Cilia with two well-defined dark lines .....  | 25. <i>crossophragma</i>  |
| Cilia without two lines .....                    | 5.                        |

- |  |                         |
|--|-------------------------|
| 5. Face ochreous or reddish .....  | 6.                      |
| Face blackish .....  | 9                       |
| 6. Fillet white .....  | 14. <i>chloristis</i> . |
| Fillet ochreous or reddish .....   | 7.                      |
| 7. Forewings sprinkled with black .....  | 8.                      |
| Forewings not sprinkled with black .....                                       | 15. <i>neozesta</i> .   |
| 8. Wings pale reddish-ochreous .....   | 18. <i>rubraria</i> .   |
| Wings fuscous or whitish-ochreous .....  | 17. <i>lydia</i> .      |
| 9. Hindwings with hindmargin angulated, with<br>slight median projection ..... | 10.                     |
| Hindwings with hindmargin not angulated,<br>without projection .....           | 11.                     |
| 10. Median line distinct .....   | 26. <i>perlata</i> .    |
| Median line absent .....   | 27. <i>ligataria</i> .  |
| 11. Wings with groundcolour snow-white .....                                   | 5. <i>innocens</i>      |
| Wings with groundcolour not white .....  | 12.                     |
| 12. Posterior tibiae in ♂ very short, in ♀ with<br>middle-spurs absent .....   | 13.                     |

20. Forewings with a straight fuscous streak from apex to before middle of inner margin 16. *desita*.  
 Forewings without such streak ..... 21.
21. Second line marked with distinct black dots 24. *sublinearia*  
 Second line not marked with distinct black dots ..... 22.
22. Cilia sprinkled with black towards base..... 23.  
 Cilia not sprinkled with black towards base 24.
23. Forewings with median line angularly indented below middle ..... 13. *hypochra*.  
 Forewings with median line not angularly indented below middle ..... 21. *axiotis*.
24. Posterior tarsi in ♂  $\frac{2}{3}$  of tibiae..... 20. *liotis*.  
 Posterior tarsi in ♂  $\frac{1}{3}$  of tibiae..... 25.
25. Median line strongly marked ..... 22. *recessata*.  
 Median line very faint..... 23. *optivata*.

Sect. A. Posterior tibiae of ♂ without spurs.

Subsect. a. Posterior tibiae of ♂ short, subaborted, of ♀ without middle-spurs.

### 5. *Ac. innocens*, Butl.

(*Idaea innocens*, Butl., Trans. Ent. Soc. Lond., 1886, 436.)

♂♀. 15-17 mm. Head white on crown, face blackish-fuscous. Papi whitish, mixed with dark fuscous. Antennae white, in ♂ filiform, ciliations  $1\frac{1}{2}$ . Thorax white. Abdomen white, base of segments dark fuscous. Legs white, anterior pair infuscated, posterior tibiae in ♂ scarcely dilated, tarsi well-developed, longer than tibiae (posterior legs in ♀ broken). Forewings with costa straight, posteriorly slightly arched, hind margin obliquely rounded; white, with a few fine dark fuscous scales towards base; costal edge sometimes pale fuscous; first and second lines pale fuscous, very indistinct, marked with minute black dots on veins, first from  $\frac{1}{3}$  of costa to  $\frac{2}{5}$  of inner margin, curved, second from  $\frac{3}{4}$  of costa to  $\frac{2}{4}$  of inner margin, sinuate above and below middle;



median line from  $\frac{2}{3}$  of costa to middle of inner margin, indistinct, pale fuscous, twice sinuate, marked with a black discal dot on its anterior edge; subterminal forming a narrow dark fuscous fascia, somewhat suffused anteriorly, nearly obsolete on costa, sinuate inwards above middle and above anal angle; submarginal cloudy, dark fuscous, not reaching costa or inner margin; an interrupted black hindmarginal line; cilia white, basal  $\frac{1}{2}$  irrorated with dark fuscous. Hindwings with hindmargin rounded; veins 6 and 7 from a point or short-stalked; colour and markings as in forewings, but first line absent, discal dot placed beyond median, subterminal fascia reduced to a cloudy line, paler and often obsolete except towards costa, submarginal very indistinct or obsolete except on costa, dark irroration of cilia much scantier or absent except round apex.

Duaringa, Queensland; sent commonly by Mr. G. Barnard; very distinct from any other Australian species.

*G. la. albicincta* Walk.

dark grey hindmarginal line : cilia purplish or pale grey, terminal half grey-whitish, purplish-tinged. Hindwings with hindmargin rounded ; veins 6 and 7 stalked ; colour and markings as in forewings, but first line and discal dot absent.

Duaringa, Queensland ; Glen Innes (3500 feet), Bathurst, Sydney, and Mount Kosciusko (3700 feet), New South Wales ; Launceston and Deloraine, Tasmania ; from September to March, common.

7. *Ac. isomorpha*, n. sp.

♂. 16 mm. Differs from *A. albicostata* only as follows : antennæ filiform, ciliations 1 ; posterior tibiæ very short, tarsi as long as tibiæ ; wings greyer, with a pale postmedian band, second line consisting of a series of black dots, subterminal forming a narrow grey fascia ; cilia whitish, with an obscure grey line ; vein 11 of forewings anastomosing strongly with 9.

Mount Lofty, South Australia ; one specimen sent by Mr. E Guest.

8 *Ac. philocosma*, n. sp.

♂♀. 17-18 mm. Head whitish-ochreous, fillet ochreous-white, face blackish. Palpi ochreous-whitish, sometimes suffused with blackish. Antennæ whitish, in ♂ filiform, ciliations  $\frac{3}{4}$ . Thorax and abdomen pale whitish-ochreous. Legs fuscous, posterior pair ochreous-whitish, posterior tibiæ in ♂ very short, without spurs, in ♀ with middle-spurs absent, posterior tarsi in ♂ as long as tibiæ. Forewings with costa posteriorly moderately arched, hindmargin slightly rounded, oblique ; pale whitish-ochreous, more greyish-ochreous towards base and costa ; first line indicated by two or three blackish dots on veins ; median from  $\frac{2}{3}$  of costa to middle of hindmargin, scarcely darker, dotted with black on veins, twice sinuate ; second somewhat darker, similar and parallel ; subterminal and submarginal cloudy, rather broad, greyish-ochreous, waved ; a widely interrupted black hindmarginal line : cilia pale whitish-ochreous. Hindwings with hindmargin rounded ; veins 6

subterminal close and parallel to second, slightly diverging on costa; submarginal paler; an interrupted black hindmarginal line: cilia ochreous-whitish, with a cloudy grey interrupted median line. Hind wings with hindmargin rounded, much but obtusely between veins 8 and 4, inner margin short; veins 6 and 7 stalked; colour and markings as in forewings, but median line nearer base, posterior lines more curved.

Perth, West Australia; one specimen in November.

12. *Ac. pselota*, n. sp.

♀. 19 mm. Head, palpi, antennae, thorax, abdomen, and legs ochreous-whitish; face rather dark fuscous; posterior tibiae with middle-spurs absent. Forewings with costa posteriorly somewhat arched, hindmargin slightly bowed, oblique; ochreous-whitish; first line dark grey, irregularly dentate, not reaching costa, preceded by a parallel series of dark grey spots; median hardly traceable, indicated by faint grey dots on veins, preceded by a

with black, base of segments brownish-tinged. Legs ochreous-whitish, anterior pair infuscated; posterior tibiae rather short, dilated, rough-scaled above, with long pencil of hairs from base lying on inner side, without spurs, tarsi as long as tibiae. Forewings with costa posteriorly somewhat arched, hindmargin somewhat rounded, oblique; pale brownish-ochreous or whitish-ochreous, slightly reddish-tinged, sprinkled with black; lines slender grey; first from  $\frac{1}{3}$  of costa to  $\frac{1}{4}$  of inner margin, indistinct, hardly curved; median from  $\frac{2}{3}$  of costa to middle of inner margin, rather angularly indented below middle, preceded by a small black discal dot; second line from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin, slightly waved, twice faintly sinuate, obscurely dotted with darker on veins; subterminal and submarginal cloudy; a hindmarginal series of black dots: cilia whitish-ochreous, slightly reddish-tinged, basal half sprinkled with black. Hindwings with hindmargin rounded; veins 6 and 7 from a point; colour and markings as in forewings, but first line absent, median nearer base, hardly indented, discal dot larger, beyond median line.

Duaringa, Queensland; Sydney, New South Wales; Mount Lofty, South Australia; in June, several specimens.

14. *Ac. chloristis*, n. sp.

♂. 15-16 mm. Head brownish-ochreous, fillet white. Palpi whitish-ochreous. Antennae ochreous-whitish, serrate, ciliations 2. Thorax white, anterior margin slenderly pale ochreous. Abdomen white. Legs white, anterior pair fuscous, posterior tibiae dilated, rough-scaled above, with long dense pencil of hairs from base lying on inner side, without spurs, tarsi  $\frac{1}{3}$ . Forewings with costa hardly arched, hindmargin slightly rounded, oblique; white, sometimes partially sprinkled with whitish-ochreous, and with a few black scales; costa narrowly ochreous; lines light ochreous, thick, well-defined, denticulate; first from  $\frac{2}{3}$  of costa to  $\frac{1}{3}$  of inner margin, somewhat sinuate below middle; median from beyond middle of costa to middle of inner margin, sinuate inwards above and below middle, followed closely by a very minute black discal

dot; second from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, slightly sinuate above inner margin; subterminal tending to be interrupted into spots, submarginal partly touching hindmargin; a fine ochreous hindmarginal line: cilia pale whitish-ochreous. Hindwings with hindmargin rounded; veins 6 and 7 stalked; colour and markings as in forewings, but first line and discal dot obsolete, median straighter, second line more sinuate.

Queensland; two specimens (Coll. Lucas).

15. *Ac. neoxesta*, n. sp.

♂. 29 mm. Head light ochreous on crown, fillet ferruginous, face ferruginous-whitish, forehead ferruginous. Palpi blackish, beneath whitish. Antennæ ochreous-whitish, dentate, ciliations  $1\frac{1}{2}$ . Thorax, abdomen, and legs ochreous-whitish, posterior tibiae dilated, rough-scaled above, with long dense pencil of hairs from base lying on inner side, without spurs, tarsi  $\frac{3}{4}$ . Forewings with costa moderately arched, hindmargin bowed, rather oblique: very

white, sprinkled with black, segments with more or less distinct brownish median rings, in ♂ laterally tufted beyond middle, and with a circular lateral orifice at base. Legs grey, posterior pair whitish, posterior tibiae in ♂ moderate, dilated, clothed with dense rough hairs above, and with an expansible pencil of hairs in groove beneath, in ♀ with all spurs present, posterior tarsi in ♂  $\frac{1}{2}$ . Forewings with costa posteriorly moderately arched, hindmargin somewhat bowed, rather oblique; white, irrorated with pale whitish-fuscous, and sprinkled with black; generally a short oblique linear black mark in disc before middle, representing first line; a black discal dot, much before median line; median absorbed in a straight fuscous streak from apex of wing to before middle of inner margin, mixed with black towards apex; second line slender, black, dentate, more or less interrupted between dentations, from  $\frac{3}{4}$  of costa to  $\frac{2}{3}$  of inner margin, curved outwards, above middle sharply indented inwards; subterminal cloudy, light fuscous, near and parallel to second; submarginal light fuscous, waved; an interrupted light fuscous hindmarginal line, marked with a series of black dots: cilia white, on basal half sprinkled with black, and obscurely barred with pale whitish-grey. Hindwings with hindmargin rounded, waved; veins 6 and 7 from a point; white, irrorated with pale whitish-fuscous and sprinkled with black; median straight, light fuscous, followed by a black discal dot; second line slender, blackish, nearly straight, twice somewhat sinuate on upper half; subterminal thick, cloudy, light fuscous, near and parallel to second; submarginal and hindmarginal lines, and cilia as in forewings.

Duaringa and Toowoomba (2000 feet), Queensland; Sydney, New South Wales; in December, April, and June, not uncommon.

17. *Ac. lydia*, Butl.

(*Idaea lydia*, Butl., Trans. Ent. Soc. Lond. 1886, 435;  
*I. jessica*, ib. 436.)

♂. 16-18 mm. Head greyish-ochreous. Palpi ochreous-whitish, towards apex greyish-ochreous. Antennæ whitish, dentate,

ciliations 3. Thorax and abdomen light fuscous, mixed with pale greyish ochreous. Legs grey, posterior pair whitish, posterior tibiae rather short, dilated, rough-scaled above, without spurs, tarsi about  $\frac{2}{3}$ . Forewings with costa gently arched, hindmargin slightly rounded, oblique; fuscous, suffusedly sprinkled with light greyish ochreous; lines scarcely darker, placed as in ♀ but hardly traceable: oilia fuscous, sprinkled with pale greyish-ochreous, tips paler. Hindwings with hindmargin rounded, waved; veins 6 and 7 stalked; colour and markings as in forewings.

♀. 17-19 mm. Head, palpi, antennae, thorax, abdomen, and legs pale whitish-ochreous, posterior tibiae with all spurs present. Forewings formed as in ♂; pale whitish-ochreous, sprinkled with black, towards base slightly brownish-tinged; first line greyish-ochreous, very indistinct; median from beyond middle of costa to middle of inner margin, very faint, straight, marked with a very small black discal dot; second from  $\frac{2}{3}$  of costa to before  $\frac{1}{3}$  of inner margin, nearly straight, rather thick, greyish-ochreous, posterior edge most defined, subterminal clearly indistinct, pale greyish-

Antennæ white, annulated with dark fuscous, in ♂ dentate, ciliations 4. Thorax and abdomen light reddish-ochreous, often irrorated with dark grey. Legs white, more or less irrorated with dark grey, posterior tibiæ in ♂ dilated, rough-scaled above, with long pencil of hairs from base lying on inner side, without spurs, in ♀ with all spurs present, posterior tarsi in ♂  $\frac{1}{2}$ . Forewings with costa gently arched, hindmargin slightly rounded, oblique; pale reddish-ochreous, more or less sprinkled with black; lines grey or dark fuscous, variable in intensity, indistinct or strongly marked; first from  $\frac{1}{3}$  of costa to  $\frac{1}{2}$  of inner margin, denticulate, bent near costa; median from  $\frac{2}{3}$  of costa to middle of inner margin, denticulate or cloudy, slightly curved on upper  $\frac{2}{3}$ , closely preceded by a transverse dark fuscous discal dot; second from  $\frac{2}{3}$  of costa to before  $\frac{2}{3}$  of inner margin, denticulate, hardly curved, slightly sinuate below costa and above inner margin; subterminal cloudy, waved, sometimes suffused into second except towards costa; submarginal cloudy, tending to be interrupted into spots; a hindmarginal row of black dots: cilia pale reddish-ochreous, with alternating basal and median series of obscure fuscous spots, on terminal half sometimes greyish-tinged. Hindwings with hindmargin rounded; veins 6 and 7 separate or almost from a point; colour and markings as in forewings, but first line absent, median straighter, rather sinuate inwards above middle, closely followed by discal dot.

Duaringa and Toowoomba, Queensland; Glen Innes (3500 feet), Bathurst, Sydney, and Blackheath (3500 feet), New South Wales; Melbourne, Victoria; Launceston and George's Bay, Tasmania; Mount Lofty and Port Lincoln, South Australia; Albany, West Australia; from September to April and in July, generally distributed and usually abundant. Also from Norfolk Island and New Zealand.

19. *Ac. caesaria*, Walk.

(*Acidalia caesaria*, Walk. 750; *A. obturbata*, ib. 755.)

♂♀, 20-22 mm. Head reddish-ochreous, fillet white, face blackish. Palpi blackish, towards base reddish-fuscous, beneath



whitish-ochreous. Antennae ochreous-whitish, in ♂ subdentate, ciliations 2. Thorax and abdomen whitish-ochreous. Legs whitish-ochreous, anterior pair infuscated, posterior tibiae white, in ♂ dilated, rough-scaled above, with long pencil of hairs from base lying on inner side, without spurs, in ♀ with all spurs present, posterior tarsi in ♂  $\frac{1}{2}$ . Forewings with costa posteriorly moderately arched, hindmargin somewhat bowed, rather oblique; whitish-ochreous, minutely sprinkled with blackish; costal edge slenderly reddish-ochreous; first line cloudy, fuscous-reddish, indicated on lower half only; median cloudy, fuscous-reddish, from beneath costa at  $\frac{1}{3}$  to middle of inner margin, rather irregular, preceded by a black discal dot; second from  $\frac{1}{2}$  of costa to  $\frac{1}{3}$  of inner margin, slender, dark grey, denticulate, slightly curved, sometimes ill-marked; a fuscous-reddish hindmarginal band extending to second line on lower  $\frac{2}{3}$ , above attenuated to apex; subterminal and submarginal lines cloudy, waved, dark grey, only marked on hindmarginal band, obsolete above; a hindmarginal row of blackish-grey dots, tending to form a line cilia with terminal half whitish-

shortly rough-scaled above, tarsi  $\frac{2}{3}$ . Forewings with costa posteriorly moderately arched, hindmargin hardly rounded, rather oblique; clear ochreous-whitish; first line indicated by a minute black dot near inner margin at  $\frac{1}{3}$ ; a small blackish discal dot, much before median line; lines faint, slender, very pale greyish-ochreous, somewhat irregular; median from  $\frac{2}{3}$  of costa to beyond middle of inner margin, sinuate above inner margin; second from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin, slightly sinuate above middle and above inner margin, faintly dotted with grey on veins and with a black dot near inner margin; subterminal and submarginal parallel; a hindmarginal series of black dots: cilia ochreous-whitish. Hindwings with hindmargin rounded; veins 6 and 7 stalked; colour, second line, and posterior markings as in forewings; median line hardly traceable, sinuate inwards above middle, marked with a moderately large black discal dot.

Mount Kosciusko (3800 feet), New South Wales; one specimen in January; Walker's specimen is said to be from Tasmania. Walker described this species under the name of *A. compensata*, having forgotten that a few pages before he had described a quite different North American species of the same genus under the same name; I have, therefore, re-named the present species.

21. *Ac. axiotis*, n. sp.

♂♀. 23-25 mm. Head ochreous-whitish, face blackish. Palpi ochreous-whitish, above and at apex blackish. Antennæ whitish, in ♂ dentate, ciliations  $2\frac{1}{2}$ . Thorax ochreous-whitish. Abdomen ochreous-whitish, sprinkled with black or fuscous. Legs grey, posterior pair white, posterior tibiae in ♂ dilated, somewhat rough-scaled above, with long dense pencil of hairs from base lying on inner side, without spurs, in ♀ all spurs present, posterior tarsi in ♂  $\frac{2}{3}$ . Forewings with costa posteriorly gently arched, hindmargin slightly rounded, rather oblique; ochreous-whitish, minutely sprinkled with black or fuscous; lines faint, pale ochreous-greyish; first from  $\frac{1}{3}$  of costa to  $\frac{1}{3}$  of inner margin, rather strongly curved; a black discal dot much before median; median

from  $\frac{1}{2}$  of costa to middle of inner margin, cloudy, waved, hardly sinuate; second from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin, dentate, finely dotted with grey, slightly sinuate above middle and above inner margin; subterminal and submarginal cloudy, waved; a hindmarginal row of black dots: cilia ochraceous-whitish, base minutely sprinkled with blackish. Hindwings with hindmargin rounded; veins 6 and 7 stalked; colour, second line, and posterior markings as in forewings; median very faint, sinuate inwards above middle, marked with a moderate black discal dot.

Extremely similar to *A. recessata*, but differing in the greater length of the posterior tarsi of the ♂, which are  $\frac{1}{2}$  of the tibia, and by the base of the cilia sprinkled with black.

22. *Ac. recessata*, Walk.

[*Acidalia recessata*, Walk., 777, (nec Moyr., Trans. Ent. Soc. Lond., 1886, 207, sp. mixt.); (?) *A. stipataria*, ib. 779.]

rather thick, cloudy, more or less interrupted; a hindmarginal series of black dots: cilia pale whitish-ochreous. Hindwings with hindmargin round; veins 6 and 7 short-stalked or almost from point; colour, second line, and posterior markings as in forewings; median line as in forewings, but suddenly sinuate inwards above middle; a moderate black discal dot on this, or rarely slightly beyond it.

Sydney, New South Wales; Deloraine, Tasmania; Mount Lofty, South Australia; Geraldton, West Australia; in July, August, November, and December, generally common. It is probably almost universal, but owing to the confusion of species I have rejected localities except where lately verified. On discovering the existence of closely allied forms, I took a considerable number of specimens, certainly belonging to the same species, in the early spring round Sydney, and found it to be very variable, especially in the colour of palpi, strength of markings of forewings, and depth of colouring; from the two preceding species, to which it is extremely similar, it can always be distinguished by the relatively much shorter posterior tarsi of ♂. *A. stipataria*, Walk., is probably only a deeper-coloured variety. *A. recessata*, Meyr. l.c., should be cancelled, being founded on a confusion of two species, and not strictly referable to either.

### 23. *Ac. optivata*, Walk.

(*Acidalia optivata*, Walk. 780).

♂. 18-23 mm. Head light ochreous, fillet ochreous-whitish, face blackish. Palpi ochreous-whitish, towards apex or wholly suffused with blackish. Antennæ whitish, in ♂ dentate, ciliations  $2\frac{1}{2}$ . Thorax ochreous-whitish. Abdomen ochreous-whitish, sometimes with a few black scales. Legs ochreous-whitish, anterior pair dark fuscous, middle pair fuscous-tinged, posterior tibiae dilated, rough-scaled above, with long pencil of hairs from base lying on inner side, tarsi  $\frac{1}{2}$ . Forewings with costa posteriorly moderately arched, hindmargin slightly rounded, rather oblique;

very pale whitish-ochreous, sometimes minutely sprinkled with blackish; lines pale ochreous-grey; first obsolete; a small black discal dot, much before median; median very faint, cloudy, from  $\frac{1}{2}$  of costa to middle of inner margin, nearly straight; second from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, slender, tolerably distinct, denticulate, slightly sinuate above middle and above inner margin; subterminal narrow, more or less interrupted into spots; submargin cloudy; a hindmarginal row of minute black dots: cilia pale whitish-ochreous. Hindwings with hindmargin rounded; veins 6 and 7 from a point; colour, second line, and posterior markings as in forewings; a very faint median line, suddenly sinuate inward above middle, marked with a black discal dot.

Glen Innes (3500 feet) and Sydney, New South Wales, in December, February, and April; several specimens. Although keeping this form separate at present, in default of sufficient evidence, I am inclined to believe that it is probably a summer generation of *A. recessata*, with which it agrees in structure although quite distinguishable superficially, the only tangibl

middle of inner margin, slightly curved; second quite parallel to median, marked with a series of distinct black dots on veins; subterminal and submarginal cloudy; a hindmarginal series of black dots: cilia pale whitish-ochreous, sometimes with a basal series of minute grey dots. Hindwings with hindmargin rounded; veins 6 and 7 from a point; colour and markings as in forewings, but first line absent.

Duaringa and Toowoomba, Queensland; Geraldton, West Australia; in November and December, four specimens. Recognisable by the characteristic dotted second line.

25. *Ac. crossophragma*, Meyr.

(*Acidalia crossophragma*, Meyr., Trans. Ent. Soc. Lond. 1886, 206.)

♂♀. 20-23 mm. Head light ochreous, fillet white, face rather dark ochreous-brown. Palpi ochreous-fuscous or pale ochreous. Antennæ white, dotted with dark fuscous, in ♂ subdentate, filiations  $2\frac{1}{2}$ . Thorax and abdomen whitish-ochreous. Legs grey, anterior pair whitish, posterior tibiae in ♂ dilated, rough-scaled above, with long pencil of hairs from base lying on inner side, in ♀ with all spurs present, posterior tarsi in ♂  $\frac{1}{3}$ . Forewings with costa posteriorly moderately arched, hindmargin somewhat bowed, rather oblique; pale whitish-ochreous, sprinkled with fuscous or dark fuscous; lines grey, slender, waved, sometimes indistinct; first nearly straight, very faint; a small black discal lot, much before median; median from  $\frac{2}{3}$  of costa to middle of inner margin, cloudy, hardly curved; second from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, hardly curved; subterminal and submarginal similar; a hindmarginal row of black dots, connected by a very fine sometimes incomplete line: cilia whitish-ochreous, terminal half whitish, with a well-defined slender grey line near base, and a stronger dark grey median line. Hindwings with hindmargin rounded, somewhat bent in middle; veins 6 and 7 separate; colour and markings as in forewings, but first line absent, discal lot larger, placed on posterior edge of median, subterminal and submarginal more curved.

Duaringa and Rosewood, Queensland; in December, several specimens. Also from New Guinea. Easily recognised by the two well-marked dark lines of cilia.

26. *Ac. perlata*, Walk.

(*Acidalia perlata*, Walk. 776.)

♂♀. 20-23 mm. Head pale ochreous, fillet ochreous-whitish, face blackish. Palpi blackish, beneath whitish-ochreous. Antennae whitish, in ♂ dentate, ciliations 3. Thorax and abdomen pale whitish ochreous, with a few black scales. Legs whitish-ochreous, anterior pair grey, posterior tibiae whitish, in ♂ dilated, rough-scaled above, with long pencil of hairs lying on inner side, without spurs, in ♀ with all spurs present, posterior tarsi of ♂  $\frac{1}{2}$ . Forewings with costa gently arched, hindmargin somewhat bowed, rather oblique; pale whitish-ochreous, sprinkled with black; lines greyish-ochreous, ill-defined; first nearly obsolete; a minute black discal dot, much before median; median from beneath costa at  $\frac{1}{4}$  to

♀. 21-22 mm. Head pale ochreous, fillet white, face blackish. Palpi blackish, beneath white. Antennæ, thorax, abdomen, and legs white; anterior legs grey, posterior tibiæ with all spurs present. Forewings with costa gently arched, hindmargin bowed, oblique; white; first line indicated by one or two fuscous dots; a minute black discal dot; median line absent; second whitish-ochreous or ochreous-yellowish, very slender, waved, obsolete on costal fourth, more or less strongly margined anteriorly with dark fuscous on second fourth from costa and on dorsal fourth, very faint between these; subterminal only distinctly indicated opposite dark portions of second line, cloudy, rather dark fuscous, tending to be suffused into second, but sometimes almost entirely obsolete; submarginal very faint, cloudy, pale whitish-ochreous; a more or less interrupted blackish hindmarginal line: cilia white, with some indistinct fuscous dots near base. Hindwings with hindmargin angulated in middle, with moderate triangular projection; veins 6 and 7 separate; colour, discal dot, submarginal and hindmarginal lines, and cilia as in forewings; second line slender, waved, somewhat curved, faint whitish-ochreous, with one or two black scales; subterminal faint, cloudy, pale whitish-ochreous.

Duaringa, Queensland; three specimens sent by Mr. G. Barnard. Also from Formosa, Celebes, and India.

Sect. B. Posterior tibiæ of ♂ with terminal spurs.

28. *Ac. orthoscia*, n. sp.

♂♀. 16-19 mm. Head pale ochreous, fillet white, face blackish. Palpi ochreous-whitish. Antennæ whitish, in ♂ serrate, ciliations  $2\frac{1}{2}$ . Thorax and abdomen pale whitish-ochreous. Legs ochreous-whitish, posterior tibiæ in ♂ well-developed, slender, with terminal spurs, in ♀ with all spurs present, posterior tarsi in ♂ 1, fully developed. Forewings with costa posteriorly moderately arched (less in ♀), hindmargin slightly rounded, oblique; pale whitish-ochreous, in ♀ thinly sprinkled with black; lines pale ochreous; first nearly straight, indistinct; a minute black discal dot before



median; median from  $\frac{3}{4}$  of costa to beyond middle of inner margin, somewhat darker than other lines, cloudy, straight; second from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin, slender, straight; subterminal rather slender, very near second; submarginal slender, indistinct; a hindmarginal row of black dots: cilia pale whitish-ochreous. Hindwings with hindmargin rounded; veins 6 and 7 from a point or separate; colour and markings as in forewings, but first line absent, discal dot on or immediately beyond median, second and posterior lines rather curved.

Geraldton and Perth, West Australia; in October and November, several specimens.

29. *Ac. megalocentra*, n. sp.

♂. 23 mm. Head whitish-ochreous, fillet white, face black. Palpi blackish, beneath whitish. Antennae whitish, filiform, ciliations 3. Thorax and abdomen ochreous-whitish, with a few

30. *Ac. episcia*, n. sp.

♂. 18-19 mm. Head, palpi, and thorax dark grey, more or less mixed with ochreous-whitish. Antennæ grey-whitish, serrate, ciliations 2. Abdomen and legs whitish, irrorated with dark grey, posterior tibiæ well-developed, slender, with terminal spurs, tarsi fully-developed, longer than tibiæ. Forewings with costa straight, hindmargin bowed, oblique; white, suffusedly irrorated with fuscous; costa and a basal patch bounded by a line from before middle of costa to near base of inner margin fuscous, sprinkled with black; first from middle of costa to  $\frac{1}{4}$  of inner margin, hardly curved; a dark fuscous discal dot before median; median strong, rather irregular, cloudy, fuscous, mixed with black, from  $\frac{3}{4}$  of costa to before middle of inner margin, sinuate inwards below middle, anteriorly more or less suffused; second from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin, tolerably parallel to hindmargin, somewhat irregular; subterminal fuscous sprinkled with black, more or less strong, near and parallel to second, followed by a nearly clear white line; submarginal fuscous, indistinct; an entire dark fuscous hindmarginal line, marked with black dots: cilia fuscous, very obscurely barred with whitish, base whitish. Hindwings with hindmargin rounded, obtusely much bent about veins 3 and 4, sinuate above anal angle, inner margin short; veins 6 and 7 stalked; colour, second line, and all posterior markings as in forewings, but second line markedly sinuate inwards above middle; a cloudy fuscous median line, irrorated with black, rather abruptly sinuate inwards above middle, followed by a black discal dot.

Carnarvon, West Australia; two specimens in October.

## 5. TIMANDRA, Dup.

Face smooth. Antennæ in ♂ bipectinated, towards apex filiform. Palpi moderate, porrected or ascending, second joint with rather dense tolerably appressed scales, slightly rough beneath, terminal joint moderate. Thorax smooth beneath. Posterior

femora in ♂ sometimes with tuft of hairs; posterior tibiae in ♂ cylindrical, sometimes clothed with dense hairs, all spurs present, tarsi developed. Forewings with veins 3 and 4 sometimes from a point, 6 remote from 9, 10 out of 9, 11 connected at a point or anastomosing with 9. Hindwings with veins 3 and 4 stalked or closely approximated, 6 and 7 stalked.

A small genus, principally Indo-Malayan, but with stragglers in other regions. The genus may be regarded as including two main sections, in the first of which the posterior legs are furnished with tufts of hair in the ♂, whilst in the other they are simple; both the Australian species belong to the first section. Probably both are really Malayan, ranging into Australia.

31. *Tim. aventiaria*, Gn.

(*Timandra aventiaria*, Gn. x, 3.)

♂♀ 25-28 mm. Head reddish ochreous, fillet whitish-ochreous.

middle, forming a moderate triangular projection; colour and cilia as in forewings; a small whitish discal dot; a straight line, as in forewings, from beyond middle of costa to below middle of inner margin.

Duaringa, Queensland; sent commonly by Mr. G. Barnard. According to the British Museum also from India and Ceylon.

32. *Tim. prasodes*, n. sp.

♂. 26-27 mm. Head reddish-ochreous, fillet ochreous-whitish. Palpi whitish-ochreous, towards apex reddish-ochreous. Antennæ rosy-whitish, pectinations *a* 4, *b* 7. Thorax, abdomen, and legs whitish-ochreous, posterior femora with large rough tuft of hairs near base beneath, posterior tibiae clothed beneath with dense long hairs, inner middle-spur flattened. Forewings with costa posteriorly moderately arched, hindmargin oblique, somewhat angularly projecting in middle, upper half very slightly concave, lower half straight; pale ochreous-greenish; a white discal dot, slenderly margined with fuscous; a faint straight whitish-ochreous line, obscurely margined with darker anteriorly, from  $\frac{5}{8}$  of costa to beyond middle of inner margin; a posterior series of faint cloudy darker dots: cilia reddish-whitish, basal third reddish-grey. Hindwings with hindmargin angulated in middle, forming a short triangular projection; colour and markings as in forewings, but median line running from beyond middle of costa to below middle of inner margin.

Duaringa, Queensland; three specimens received from Mr. G. Barnard.

6. *UROLITHA*, n. g.

Face smooth. (Ocelli present.) Antennæ in ♂ serrate, biciliated with fascicles. Palpi moderate, slender, loosely scaled, porrected, terminal joint in ♂ short, in ♀ moderately long. Posterior tibiae in ♂ somewhat thickened, grooved, containing a pencil of long hairs, all spurs present. Thorax slightly hairy beneath. Abdomen in ♂ with prensors strong, each with an

internal outwards-curved hook at base, uncus laterally double throughout, with a long straight simple process from pediment beneath. Forewings with veins 3 and 4 stalked, 6 from point with or out of 9, 10 out of 9, 11 free or anastomosing with 12. Hindwings with veins 3 and 4 stalked, 6 and 7 stalked.

I note the presence of distinct ocelli in this genus, but in a group such as the *Geometrina*, where they tend strongly to become permanently obsolete, I doubt if the structure is of any generic value.

33. *Urol bipunctifera*, Walk.

(*Iodis bipunctifera*, Walk., 546.)

♂♀. 21-26 mm. Face yellow-ochreous, forehead deep carmine, fillet and postorbital rim white, crown yellowish-green. Palpi white, above carmine. Antennae white, becoming ochreous towards apex. Thorax green. Abdomen green, apex and sides white, sometimes (not always or sexually) with a dorsal ochreous streak not reaching base, and marked with four or five raised

Newcastle and Sydney, New South Wales, from September to November; eight specimens, taken mostly at lamps. The species is variable, but widely different from any other known to me.

### 7. EUCROSTIS, Hb.

Face smooth. Antennæ in ♂ bipectinated, towards apex simple. Palpi rather short, porrected, loosely scaled, terminal joint short or moderate. Posterior tibiae in both sexes with middle spurs absent. Abdomen in ♂ with uncus simple, with basal process beneath. Forewings with veins 3 and 4 separate, 6 separate or from point with or out of 9, 10 out of 9, 11 anastomosing with or running into 12. Hindwings with veins 3 and 4 separate or stalked, 6 and 7 from a point or stalked.

The genus is apparently nearly cosmopolitan, but not very large.

- |  |                          |
|--|--------------------------|
| 1. Wings with white transverse lines ..... | 2.                       |
| Wings without white transverse lines ..... | 36. <i>iocentra</i> .    |
| 2. Face green.....                         | 34. <i>argocrana</i> .   |
| Face ferruginous .....                     | 35. <i>latilineata</i> . |

### 34. *Eucr. argocrana*, n. sp.

♂. 26 mm. Face and fillet light green, crown white. Palpi and antennæ white. Thorax light green, sides narrowly white. Abdomen whitish, mixed with greenish. Legs white, femora and coxae greenish. Forewings with costa moderately arched, hindmargin oblique, hardly rounded; vein 6 separate from 9, 11 anastomosing with 12; pale yellowish-green; costa narrowly white; lines white; first from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, slender, moderately curved; second from costa near apex to  $\frac{2}{3}$  of inner margin, moderately thick, attenuated above, almost straight: cilia white, towards base greenish. Hindwings with hindmargin rounded; veins 3 and 4 separate, 5 equidistant between 4 and 6, 6 and 7 from a point; pale yellow-greenish: cilia as in forewings.

Victoria; one specimen (Coll. Lucas).

35. *Eucr. latilineata*, Walk.*(Geometra latilineata*, Walk. Suppl. 1605.)

♂. 15-16 mm. Head and palpi ferruginous. Antennae ochreous-whitish or ochreous, beneath ferruginous, pectinations short. Thorax whitish-green, anterior margin broadly pale ochreous, collar ferruginous. Abdomen ochreous-whitish. Legs ferruginous, beneath whitish. Forewings with costa almost straight, hind-margin obliquely rounded; vein 6 out of 9, 11 anastomosing with 12; rather light bluish-green (rapidly fading to more yellowish); a moderate whitish-ochreous costal streak, gradually attenuated to apex, extreme costal edge more or less ferruginous towards base; lines ochreous-whitish; first from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, slender, curved, sometimes obsolete towards costa; second from  $\frac{1}{5}$  of costa to  $\frac{1}{5}$  of inner margin, straight, moderately thick; cilia pale greenish, terminal half whitish. Hindwings with hind-margin strongly rounded; veins 3 and 4 stalked, 6 and 7 stalked

rounded; veins 3 and 4 stalked, 6 and 7 stalked; colour, discal spot, hindmarginal lunules, and cilia as in forewings.

Duaringa, Queensland; one specimen sent by Mr. G. Barnard.

#### 8. COMOSTOLA, n. g.

Face smooth. Antennæ in ♂ bipectinated, towards apex simple. Palpi moderate, filiform, porrected, terminal joint in ♀ very long. Posterior tibiæ (in ♂ ?) in ♀ with all spurs present. Forewings with veins 3 and 4 from a point, 6 out of 9, 10 out of 9, 11 out of 9 above 6, anastomosing with 12. Hindwings with veins 3 and 4 stalked, 6 and 7 stalked.

#### 37. *Com. perlepidaria*, Walk.

(*Eucrostis perlepidaria*, Walk. Suppl. 1610).

♂♀. 16-17 mm. Face brown, somewhat mixed with dark reddish-fuscous, fillet white, crown green with a fuscous-red spot. Palpi white, above fuscous-reddish. Antennæ whitish, base of pectinations black, pectinations long. Thorax and abdomen light bluish-green (partly defaced). Legs white, anterior pair dark reddish-fuscous above. Forewings with costa moderately arched, hindmargin rather oblique, slightly rounded; rather light bluish-green; a narrow pale ferruginous costal streak, irregularly mixed with leaden-metallic scales; markings deep brown-red, margined with whitish; first line indicated by a small spot on inner margin before  $\frac{1}{4}$ ; a moderate discal spot, containing a transverse bright leaden-metallic mark; second line indicated by an outwards-curved series of dots on veins from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, middle one somewhat larger, series terminating in a small spot on inner margin; a leaden-metallic hindmarginal line, mixed with fuscous-red, interrupted by whitish dots on veins: cilia whitish-ochreous. Hindwings with hindmargin moderately bent on vein 4; colour, discal spot, second and hindmarginal lines, and cilia as in forewings.



Brisbane, Queensland; two specimens received from Dr. Loom. I may repeat here what I have noted elsewhere, that in the case of this and all other species quoted by Walker as from "Swan River, Mr. Diggles' collection" some mistake was made, as all these species appear to be really from Queensland, where Mr. Diggles principally collected.

#### 9. *Iodis*, Hb.

Face smooth. Antennæ in ♂ bipectinated, towards apex simple. Palpi short or moderate, second joint loosely scaled or shortly rough-scaled beneath, terminal joint short or moderately long, porrected. Thorax sometimes hairy beneath. Posterior tibiae in ♂ often thickened and grooved, with pencil of hairs in groove, all spurs present. Abdomen in ♂ with uncus simple, with basal process beneath. Forewings with veins 3 and 4 stalked or separate, 6 out of 9 or separate, 10 out of 9, 11 free or anastomosing with 12 and sometimes with 10 also, rarely running into 12. Hindwings with veins 3 and 4 separate or stalked, 6 and 7

- |   |                            |
|---|----------------------------|
| 1. Forewings more or less marked with red or brown.....         | 2.                         |
| Forewings not marked with red or brown                          | 14.                        |
| 2. Wings with numerous short transverse whitish strigulae ..... | 3.                         |
| Wings without transverse strigulae .....                        | 5.                         |
| 3. Face partly green... ..                                      | 4.                         |
| Face wholly red.....  | 74. <i>saturataria</i> .   |
| 4. Crown green .....  | 75. <i>metaspila</i> .     |
| Crown ferruginous .....   | 77. <i>pieroides</i> ♀.    |
| 5. Hindwings with two white subapical spots                     | 68. <i>buprestaria</i> .   |
| Hindwings without white subapical spots                         | 6.                         |
| 6. Forewings with a ferruginous streak along inner margin.....  | 70. <i>boisduvalaria</i> . |
| Forewings without ferruginous streak along inner margin .....   | 7.                         |
| 7. Crown wholly white .....                                     | 71. <i>partita</i> .       |
| Crown not wholly white.....                                     | 8.                         |
| 8. Face green.....  | 9.                         |
| Face not green.....   | 10.                        |
| 9. Crown brown.....   | 76. <i>insperata</i> ♀.    |
| Crown green .....   | 72. <i>ioeticta</i> .      |
| 10. Forewings with whitish longitudinal streaks                 | 69. <i>exoterica</i> .     |
| Forewings without whitish longitudinal streaks .....            | 11.                        |
| 11. Discal spot of hindwings leaden-metallic...                 | 66. <i>leucomerata</i> .   |
| Discal spot of hindwings not leaden-metallic .....              | 12.                        |
| 12. Crown green.....  | 73. <i>crossota</i> .      |
| Crown crimson .....   | 13.                        |
| 13. Wings with a hindmarginal series of purplish spots .....    | 67. <i>rhodocoema</i> .    |
| Wings without hindmarginal series of purplish spots .....       | 61. <i>cadmaria</i> .      |
| 14. Head wholly without green marking .....                     | 15.                        |
| Head more or less marked with green .....                       | 20.                        |

- |  |                          |
|--|--------------------------|
| 15. Hindwings ochreous-yellow ..                                 | 43. <i>gratiosa</i> .    |
| Hindwings not yellow ..  | 16.                      |
| 16. Hindwings much paler than forewings,<br>green-whitish ..     | 46. <i>pyropa</i> .      |
| Hindwings concolorous with forewings,<br>green ..                | 17.                      |
| 17. Fillet light yellow, concolorous with crown                  | 54. <i>carenaria</i> .   |
| Fillet white ..  | 18.                      |
| 18. Cilia light yellow ..  | 49. <i>melocroea</i> .   |
| Cilia ochreous-whitish ..  | 19.                      |
| 19. Anterior coxæ orange ..                                      | 55. <i>submissaria</i> . |
| Anterior coxæ silvery-white, outer side<br>ochreous and green .. | 56. <i>argocnemis</i> .  |
| 20. Face partly or wholly green ..                               | 21.                      |
| Face entirely without green ..                                   | 35.                      |
| 21. Base of cilia fuscous crimson ..                             | 63. <i>semicrocea</i> .  |
| Base of cilia green or whitish ..                                | 12.                      |

- |   |                            |
|---|----------------------------|
| 29. First and second lines slender.....   | 76. <i>insperata</i> ♂.    |
| First and second lines broad.....   | 77. <i>pietroides</i> ♂.   |
| 30. Second line of forewings whitish.....                                       | 31.                        |
| Second line of forewings not whitish.....                                       | 33.                        |
| 31. Forewings with a dark green discal dot....                                  | 52. <i>neptunus</i> .      |
| Forewings without a dark green discal dot                                       | 32.                        |
| 32. Forewings with first line absent .....,..                                   | 41. <i>stereota</i> .      |
| Forewings with first line distinct..... ..                                      | 33.                        |
| 33. First line of forewings sharply hooked in-<br>wards at upper extremity..... | 40. <i>leucochorda</i> .   |
| First line of forewings straight.....   | 39. <i>hypsihrona</i> .    |
| 34. Hindmargin of hindwings strongly bent in<br>middle.....                     | 51. <i>centrophylla</i> .  |
| Hindmargin of hindwings rounded.....  | 50. <i>asemanta</i> .      |
| 35. Crown crimson in front.....   | 36.                        |
| Crown wholly green.....   | 38.                        |
| 36. Cilia whitish-ochreous at base.....   | 58. <i>dichloraria</i> .   |
| Cilia wholly pale crimson.....  | 37.                        |
| 37. Thorax and abdomen with a yellow dorsal<br>line.....                        | 59. <i>vertumnaria</i> .   |
| Thorax and abdomen without a yellow dor-<br>sal line.....                       | 60. <i>externa</i> .       |
| 38. Cilia of forewings green at base.....                                       | 39.                        |
| Cilia of forewings not green at base.....                                       | 42.                        |
| 39. Hindwings white .....   | 40.                        |
| Hindwings green .....   | 41.                        |
| 40. Lines of forewings white, distinct .....                                    | 38. <i>meandraria</i> .    |
| Lines of forewings absent.....  | 45. <i>ochthaula</i> .     |
| 41. Hindwings with hindmargin strongly<br>rounded.....                          | 57. <i>monocyma</i> .      |
| Hindwings with hindmargin obtusely bent<br>in middle .....                      | 78. <i>byrsopsis</i> .     |
| 42. Face white, forehead ferruginous.....                                       | 48. <i>citrolimbaria</i> . |
| Face wholly reddish-fuscous.....  | 47. <i>halochlora</i> .    |

38. *Iod. meandroria*, Gn.*(Iodis meandroria, Gn. ix, 355.)*

♂♀. 26-27 mm. Face and fillet orange, crown green. Palpi orange, terminal joint short. Antennae white, pectinations 8. Thorax green, slightly hairy beneath. (Abdomen broken.) Legs green above, white beneath, anterior femora and base of coxae with orange streaks, anterior tibiae and tarsi orange above, posterior tibiae in ♂ not thickened. Forewings with costa moderately arched, hindmargin oblique, faintly sinuate; veins 3 and 4 separate, 6 separate or from point with 9, 11 anastomosing or connected by bar with 12 and then with 10; bluish-green, costal edge orange; lines moderate, snow-white, margined with rather darker green, parallel, discal third curved outwards; first from beneath middle of costa to  $\frac{1}{2}$  of inner margin, second from costa near apex to  $\frac{2}{3}$  of inner margin: cilia green, tips whitish. Hindwings with hindmargin strongly rounded; veins 3 and 4

3 and 4 short-stalked ; pale whitish-green, becoming white at base and towards costa anteriorly ; a moderate ill-defined curved white line at  $\frac{2}{3}$  ; cilia whitish-green, tips whitish.

Mount Kosciusko (5000 feet), New South Wales ; one specimen in January.

40. *Iod. leucochorda*, n. sp.

♂. 28 mm. Head green, fillet white. Palpi green, terminal joint short. Antennæ white, pectinations 6. Thorax bluish-green, thinly hairy beneath. Abdomen white, narrowly pale greenish on back. Legs white, anterior and middle coxæ green, anterior femora ochreous with a green streak above, anterior tibiae and tarsi ochreous, posterior tibiae rather thickened, with groove containing pencil of whitish hairs. Forewings with costa moderately arched, hindmargin rather oblique, hardly rounded ; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 and then with 10 ; bluish-green ; costal edge narrowly ochreous-white from before middle to apex ; lines narrow, white, well-defined ; first from above middle of disc to  $\frac{1}{3}$  of inner margin, slightly sinuate, upper extremity with a short projection inwards, forming an acute hook ; second from beneath costa at  $\frac{1}{4}$  to inner margin beyond  $\frac{2}{3}$ , slightly irregular : cilia green, tips whitish. Hindwings with hindmargin strongly rounded, slightly bent on vein 4 ; 3 and 4 stalked ; pale whitish-green, becoming white towards costa ; a narrow rather irregular curved white line about  $\frac{2}{3}$  ; cilia whitish-green, tips white.

Deloraine, Tasmania ; two specimens in December.

41. *Iod. stereota*, n. sp.

♂♀. 28-33 mm. Head green, fillet whitish-ochreous. Palpi pale green, terminal joint short. Antennæ white, pectinations 6, inner series green. Thorax bluish-green, with a central whitish-ochreous line not reaching anterior margin, rather hairy beneath. Abdomen white, somewhat mixed with pale green. Legs white, more or less pale green above, posterior tibiae in ♂ rather

thickened, with groove containing pencil of whitish hairs. Forewings with costa gently arched, hindmargin rather oblique, slightly rounded; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 and sometimes afterwards with 10; bluish-green; costa narrowly whitish-ochreous; a narrow straight white line from beneath costa at  $\frac{1}{4}$  to  $\frac{2}{3}$  of inner margin: cilia green, terminal half white. Hindwings with hindmargin rounded; veins 3 and 4 short-stalked; pale bluish-green, becoming more whitish towards base; a narrow somewhat irregular rather curved whitish line about  $\frac{2}{3}$ ; cilia green, terminal half white.

Melbourne, Victoria; two specimens in October.

42. *Iod. fugitivaria*, Gn.

(*Iodis fugitivaria*, Gn. ix, 354; *I. intacta*, Walk. 545, *I. obliquissima*, ib. 546.)

♂. 28-29 mm. Face light brown, with some green marginal scales, fillet white, crown green. Palpi green, terminal joint short. Antennae white, 11 articulations. 4. Thorax bluish green.

dark crimson-fuscous. Forewings with costa slightly arched, hindmargin oblique, slightly rounded; veins 3 and 4 from a point, 6 out of 9, 11 anastomosing with 12 and then with 10; emerald-green; costa narrowly ochreous-yellow; a nearly straight snow-white line from near costa at  $\frac{1}{4}$  to near inner margin at  $\frac{3}{5}$ ; cilia emerald-green. Hindwings with hindmargin rounded; veins 3 and 4 from a point; bright ochreous-yellow; cilia ochreous-yellow.

Victoria and Tasmania; two specimens (Coll. Simson and Lucas).

44. *Iod. beryllina*, n. sp.

♀. 23 mm. Head deep orange, face with a green linear mark on each side, fillet whitish-ochreous, crown with two green dots. Palpi orange, terminal joint short. Antennæ whitish-ochreous. Thorax emerald-green, shoulders orange, beneath with a few hairs. Abdomen white. Legs fuscous-crimson, beneath ochreous-white, anterior coxæ green, posterior legs crimson-whitish. Forewings with costa hardly arched, hindmargin obliquely rounded; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 and then with 10; emerald-green; costal edge ochreous-yellow; cilia pale whitish-green. Hindwings with hindmargin irregularly rounded, bent on vein 4; 3 and 4 separate; whitish-green, becoming white towards costa anteriorly; cilia pale whitish-green.

Geraldton, West Australia; one specimen in November.

45. *Iod. ochthaula*, n. sp.

♂♀. 20-22 mm. Face light brown, fillet whitish-ochreous, crown pale green, postorbital rims white. Palpi light brown, terminal joint short. Antennæ whitish-ochreous, pectinations 5. Thorax green, thinly hairy beneath. Abdomen white. Legs white, anterior pair brownish above, posterior tibiae not thickened. Forewings with costa almost straight, hindmargin obliquely rounded; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with



12 and then with 10; yellowish-green; costal edge whitish-ochreous except towards base and apex: cilia green, terminal half white. Hindwings with hindmargin unevenly rounded; veins 3 and 4 separate; white, faintly greenish-tinged; cilia greenish-white.

Carnarvon, West Australia; three specimens in October; appears to be attached to *Eucalyptus*.

46. *Iod. pyropa*, n. sp.

♂. 23-26 mm. Head orange, fillet ochreous-white. Palpi orange, terminal joint short. Antennæ ochreous-whitish, pectinations 8. Thorax light bluish-green, shoulders orange, slightly hairy beneath. Abdomen white. Legs fuscous-carmine, anterior coxæ green, posterior legs ochreous-whitish, tibiae not thickened. Forewings with costa almost straight, hindmargin somewhat oblique, rounded; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 and then with 10; light bluish-green; costal

round anal angle white. Hindwings with hindmargin rather abruptly rounded on vein 6, thence almost straight; veins 3 and 4 short-stalked; whitish-green, base paler; cilia white.

Quorn, South Australia; one specimen in October.

48. *Iod. citrolimbaria*, Gn.

(*Chlorochroma citrolimbaria*, Gn. ix, 366.)

“♂♀. 25 mm. Face white, forehead ferruginous, fillet pale yellow, crown green. Antennæ yellow. Thorax green with a yellow dorsal line. Forewings bluish-green; costa and cilia pale yellow. Hindwings bluish-green; cilia pale yellow” (Guénée).

I have no reason to doubt that the above description indicates a species different from any I have seen, probably from Tasmania or South Australia.

49. *Iod. melocrossa*, n. sp.

(*Chlorochroma citrolimbaria*, Walk. 562, (nec. Gn.).)

♂. 24 mm. Head deep ferruginous-red, fillet white. Antennæ white. Thorax and abdomen green, with a pale yellow dorsal line not reaching anterior margin of thorax. Forewings with costa hardly arched, hindmargin slightly rounded, somewhat oblique; green; costal edge reddish-ochreous; hindmarginal line and cilia light ochreous-yellow. Hindwings with hindmargin moderately rounded; colour and cilia as in forewings.

Tasmania.

I have only seen the single British Museum specimen, from which the above description is drawn; I do not think Walker can have been right in identifying it as the preceding species.

50. *Iod. asemanta*, n. sp.

♂. 19-21 mm. Head green, fillet white. Palpi whitish-green, terminal joint short. Antennæ ochreous-white, pectinations 4.

Thorax bluish-green, slightly hairy beneath. Abdomen bluish-green, on sides white. Legs pale green, beneath white, posterior pair wholly white, tibiae rather thickened, with groove containing pencil of white hairs. Forewings with costa almost straight, hindmargin rather oblique, almost straight; veins 3 and 4 from a point, 6 from point with 9, 11 anastomosing with 12; bluish-green; costal edge whitish-ochreous, extreme edge sometimes carmine; a faint darker green discal dot; cilia light green, tips whitish. Hindwings with hindmargin rounded; veins 3 and 4 short-stalked; bluish-green; a faint darker green discal dot; hardly perceptible traces of a paler dentate line at  $\frac{3}{4}$ , cilia light green, tips whitish.

Carnarvon, West Australia; two specimens in October.

51. *Iod. centrophylla*, n. sp.

♂. 22-25 mm. Head bluish-green, fillet white. Palpi green, terminal joint moderate. Antennae white, pectinations 6. Thorax

52. *Iod. neptunus*, Butl.

(*Chlorochroma neptunus*, Butl., Trans. Ent. Soc. Lond. 1886, 435.)

♀. 26 mm. Head green, fillet white. Palpi green. Antennæ white. Thorax green. Abdomen green, sides white. Anterior legs yellow-ochreous, coxæ green. Forewings bluish-green; costal edge ochreous-white; lines slender, slightly waved, whitish; first hardly traceable; second from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, almost straight; a dark green transverse discal dot: cilia green, tips whitish. Hindwings with hindmargin rounded, somewhat bent; colour, discal dot, second line, and cilia as in forewings, but second line curved.

Queensland. I have described the British Museum type, which is the only one I have seen.

53. *Iod. inchoata*, Walk.

(*Chlorochroma inchoata*, Walk. 563.)

♀. 21-25 mm. Head green, fillet white (face partly brownish?). Forewings green; costa narrowly whitish: cilia yellowish-white. Hindwings green; cilia yellowish-white.

Said to be from New South Wales. I have described the two specimens in the British Museum, which appear to be a good and distinct species, but the head is in bad condition.

54. *Iod. carenaria*, Gn.

(*Chlorochroma carenaria*, Gn. ix, 366.)

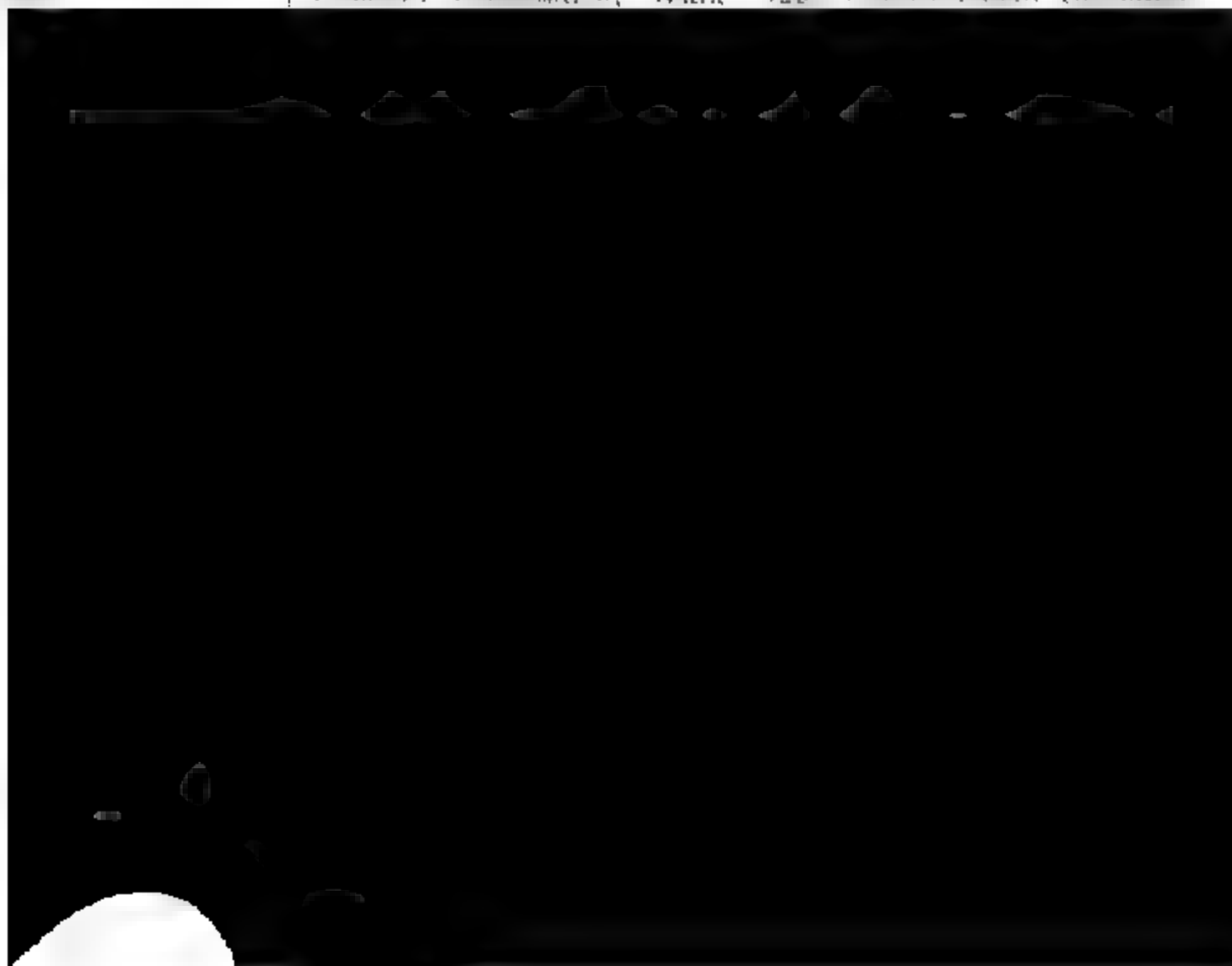
♂♀. 36 mm. Face brownish-red, fillet and crown pale yellow. Palpi brownish-red, beneath and at base yellow, terminal joint short. Antennæ pale yellow, pectinations reddish-tinged. Thorax green, posteriorly with a pale yellow dorsal line. Abdomen green, with a pale yellowish dorsal line, sides and apex white. Legs

ochreous, beneath whitish, anterior coxæ and anterior and middle femora reddish-ochreous, posterior legs ochreous-white, tibiæ in ♂ not thickened. Forewings with costa slightly arched, hindmargin oblique, hardly rounded; veins 3 and 4 from a point, 6 separate; green, costal edge whitish-ochreous, base ferruginous; first line straight, whitish, not reaching costa; second line whitish, slightly curved, not dentate, from near costa at  $\frac{3}{4}$  to  $\frac{2}{3}$  of inner margin: cilia pale yellowish, pinkish-tinged. Hindwings with veins 3 and 4 stalked; colour, second line, and cilia as in forewings, but second line more irregular and sinuous.

Probably from South-East Australia. The above description is gathered from information supplied by M. Ragonot, who at my request kindly examined Guénée's type in the National Museum at Paris; it appears to be undoubtedly a distinct species.

55. *Iod. submissaria*, Walk.

(*Chromolaena submissaria*, Walk 529. *Chromolaena carmar's*)



Deloraine, Tasmania ; Mount Lofty, South Australia ; in November and December, four specimens.

56. *Iod. argoconemis*, n. sp.

♂. 24 mm. Face deep ferruginous, fillet white, crown light yellow-ochreous, its anterior edge ferruginous. Palpi light ochreous-yellowish, terminal joint very short, ferruginous. Antennæ whitish, pectinations 7, inner series crimson-tinged. Thorax bluish-green, on posterior half with a whitish-ochreous dorsal line, shoulders narrowly ochreous-yellow, beneath slightly hairy. Abdomen white, basal half green on back, with an ochreous-yellow dorsal line throughout. Anterior legs fuscous-crimson, coxæ silvery-white, with outer side ochreous, towards base green ; middle femora crimson-whitish, tibiæ fuscous-crimson, tarsi light ochreous ; posterior legs ochreous-whitish, femora silvery-white, tibiæ not dilated. Forewings with costa hardly arched, hindmargin rather oblique, slightly rounded ; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 and then with 10 ; bluish-green ; costa narrowly whitish-ochreous, base ferruginous : cilia ochreous-whitish. Hindwings with hindmargin rounded, slightly bent on vein 4 ; 3 and 4 separate ; colour and cilia as in forewings.

Perth, West Australia ; one specimen in November.

57. *Iod. monocyma*, n. sp.

♀. 25 mm. Face pinkish-fuscous, fillet ochreous-white, crown light green. Palpi white, towards apex pinkish, terminal joint short. Antennæ ochreous-whitish, beneath ferruginous. Thorax pale green, beneath slightly hairy. Abdomen white, on back pale greenish. Legs whitish, anterior pair above dull fuscous-carmine. Forewings with costa slightly arched, hindmargin rather obliquely rounded ; veins 3 and 4 from a point, 6 separate, 11 anastomosing with 12 ; pale yellowish-green ; costal edge whitish-ochreous, rosy-tinged ; a very faint irregular paler line from beneath costa at  $\frac{3}{4}$  to inner margin at  $\frac{3}{8}$  : cilia whitish-green, tips more whitish.

Hindwings with hindmargin strongly rounded; veins 3 and 4 stalked; colour and cilia as in forewings; a faint pale irregular line about  $\frac{3}{4}$ , angulated in middle.

Carnarvon, West Australia; one specimen in October.

58. *Iod. dichloraria*, Gn.

(*Chlorochroma dichloraria*, Gn. ix, 365, pl. vi, 8.)

♂♀. 21-27 mm. Face deep crimson or fuscous-crimson, fillet ochreous-white, crown crimson in front, green behind. Palpi fuscous-crimson, base ochreous-whitish, terminal joint rather short. Antennæ ochreous-white, pectinations 7, inner series somewhat crimson-tinged. Thorax green, posterior half with an ochreous-yellow dorsal line, shoulders more or less crimson-tinged, beneath somewhat hairy. Abdomen green, with a pale ochreous-

59. *Iod. vertumnaria*, Gn.

(*Chlorochroma vertumnaria*, Gn. ix, 365 ; *O. congenita*, Walk. 564.)

♂♀. 26-29 mm. Face crimson, fillet white, crown crimson in front, green behind. Palpi crimson, terminal joint short. Antennæ ochreous-whitish, pectinations 7, inner series crimson-tinged. Thorax green, posterior half with an ochreous-yellowish dorsal line, shoulders narrowly crimson, beneath slightly hairy. Abdomen green, with a pale ochreous-yellowish dorsal line, apex and sides white. Legs crimson, posterior pair white, tibiae in ♂ somewhat thickened, with groove containing pencil of white hairs. Forewings with costa slightly arched, hindmargin somewhat oblique, hardly rounded ; veins 3 and 4 separate, 6 out of 9, 11 anastomosing with 12 ; bluish-green ; costa narrowly pale ochreous-yellowish, costal edge crimson ; lines very faintly paler, dentate, first from beneath costa at  $\frac{1}{4}$  to  $\frac{2}{5}$  of inner margin, second from beneath costa at  $\frac{2}{4}$  to  $\frac{3}{5}$  of inner margin ; an indistinct darker green discal dot : cilia pale crimson, with cloudy fuscous dots on veins. Hindwings with hindmargin rounded, slightly bent on vein 4 ; 3 and 4 from a point ; colour, discal dot, second line, and cilia as in forewings.

Sydney, New South Wales ; George's Bay, Tasmania ; in December and June, three specimens.

60. *Iod. externa*, Walk.

(*Chlorochroma externa*, Walk. 564.)

♂. 25-28 mm. Head crimson, fillet ochreous-white, back of crown narrowly green. Palpi crimson, terminal joint short. Antennæ white, partially crimson-tinged, pectinations 6, inner series more or less crimson. Thorax green, shoulders crimson, beneath somewhat hairy. Abdomen green, apex and sides white. Legs crimson, posterior pair white, tibiae in ♂ thickened, with groove containing pencil of white hairs. Forewings with costa



gently arched, hindmargin somewhat oblique, slightly rounded; veins 3 and 4 separate, 6 separate or out of 9, 11 anastomosing with 12; bluish-green; costa narrowly whitish-ochreous, costal edge crimson, at base and towards apex wholly crimson; lines slender, whitish, indistinct, dentate; first from beneath costa at  $\frac{1}{4}$  to  $\frac{2}{5}$  of inner margin, second from beneath costa at  $\frac{2}{5}$  to  $\frac{3}{5}$  of inner margin; a moderate black discal dot; a fine ochreous-white hindmarginal line: cilia light crimson, with more or less distinct blackish dots on veins. Hindwings with hindmargin rounded, slightly bent on vein 4; 3 and 4 short-stalked; colour, discal dot, second and hindmarginal lines, and cilia as in forewings.

Bathurst, New South Wales; Deloraine, Tasmania; Mount Lofty, South Australia; in November and December, four specimens.

61. *Iod. cadmaria*, Gn.

(*Chlorochroma cadmaria*, Gn. ix, 365; *C. vulnerata*, Batl. Ann. Mag. 1883, 91.)

♂♀. 21-23 mm. Head crimson, fillet white. Palpi crimson.

62. *Iod. ocyptera*, n. sp.

♂♀. 25-33 mm. Face deep ferruginous, becoming deep green on lower margin, fillet ochreous-white, crown green, postorbital rims white. Palpi white, upper surface green, terminal joint moderate or rather elongate. Antennæ whitish-ochreous, pectinations 7. Thorax green, slightly hairy beneath. Abdomen green, sides and apex white. Anterior legs deep fuscous-red, coxæ pale green; middle legs light reddish; posterior legs white, tibiæ in ♂ scarcely thickened (apparently grooved), tarsi reddish-tinged. Forewings with costa slightly arched, hindmargin somewhat oblique, slightly rounded; veins 3 and 4 from a point, 6 out of 9, 11 free; bluish-green, with numerous short transverse faint paler strigulae; costal edge whitish-ochreous; a very faintly indicated whitish line from towards costa at  $\frac{1}{4}$  to  $\frac{2}{3}$  of inner margin: cilia green, tips paler. Hindwings with hindmargin moderately rounded; veins 3 and 4 short-stalked; colour, strigulation, and cilia as in forewings.

Carnarvon and Geraldton, West Australia; in October and November, rather common, frequenting a leaf-bearing species of *Hakea* (*Proteaceae*).

63. *Iod. semicrocea*, Walk.

(*Geometra semicrocea*, Walk. 528; *Chlorochroma internixta*, ib. 563; *C. decisissima*, ib. 564.)

♂♀. 28-33 mm. Head green, fillet and postorbital rims white. Palpi ochreous-whitish, terminal joint in ♂ moderate, in ♀ long. Antennæ whitish, pectinations 6. Thorax green, moderately hairy beneath. Abdomen green, sides and apex broadly white. Anterior legs pale reddish, coxæ pale green; middle legs reddish-whitish; posterior legs whitish, tibiæ in ♂ thickened, with groove containing pencil of hairs, tarsi ochreous-tinged. Forewings with costa gently arched, hindmargin somewhat oblique, slightly rounded; veins 3 and 4 separate, 6 separate or out of 9, 11 free or connected at a point with 12; bluish-green; a narrow ochreous-white costal

streak; a faint dentate slender ochreous-whitish line from  $\frac{1}{3}$  of costa to  $\frac{2}{3}$  of inner margin: cilia whitish or pale reddish, basal half darker fuscous-crimson. Hindwings with hindmargin somewhat rounded, obtusely bent on vein 4; 3 and 4 short-stalked; colour, line, and cilia as in forewings, but line rather curved.

Glen Innes (3500 feet) and Sydney, New South Wales; Mount Lofty, South Australia; in September and December, four specimens.

64. *Iod. albicosta*, Walk.

(*Geometra albicosta*, Walk. 529.)

♀. 32 mm. Head green, fillet white. Palpi with terminal joint moderately long. Thorax green. Abdomen green, apex white. Forewings with costa and hindmargin hardly rounded; bluish-green, with numerous minute transverse whitish strigulae; costa white: cilia whitish. Hindwings with colour, strigulae, and cilia as in forewings.

interrupted by minute white dots on veins: cilia white, slightly yellowish-tinged, with grey spots on veins. Hindwings with hindmargin rounded, somewhat bent on vein 4; 3 and 4 short-stalked; colour, discal dot, posterior series of dots, hindmarginal line, and cilia as in forewings.

Cairns, Queensland; one specimen (Coll. Macleay).

66. *Iod. leucomerata*, Walk.

(*Eucrostis leucomerata*, Walk. Suppl. 1609.)

♂♀. 23 mm. Face whitish, forehead ferruginous, fillet white, crown green. Palpi whitish-ochreous, second joint ferruginous above, terminal joint in ♂ moderate, in ♀ long. Antennæ white. Thorax and abdomen green. Anterior legs ochreous, middle and posterior pair white. Forewings with costa slightly arched, hindmargin rather oblique, almost straight; veins 3 and 4 stalked, 6 out of 9, 11 free; green; costal edge slenderly white, at base and apex yellowish; lines indicated by irregular dark fuscous-red dots on veins; first from  $\frac{1}{5}$  of costa to  $\frac{1}{4}$  of inner margin; second from  $\frac{2}{3}$  of costa to  $\frac{3}{4}$  of inner margin, irregularly curved; a small deep brown-red discal spot, containing a leaden-metallic linear mark; a fine interrupted dark brown-red hindmarginal line, with leaden-metallic reflections: cilia ochreous-white, with a reddish-brown apical spot. Hindwings with hindmargin rather bent on vein 4; 3 and 4 stalked; colour, second and hindmarginal lines, and cilia as in forewings; a round leaden-metallic discal spot, edged with deep brown-red, larger than in forewings, in ♂ much larger and more irregular.

Queensland and New South Wales; two specimens.

67. *Iod. rhodocosma*, n. sp.

♂♀. 26-30 mm. Head dull crimson, fillet white. Palpi crimson, base whitish, terminal joint long. Antennæ white, partially crimson-tinged. Thorax green, posteriorly rosy on back. Abdomen

brownish-rosy, apex and sides whitish. Anterior legs crimson, middle and posterior pair whitish (posterior tibiae of ♂ broken). Forewings with costa somewhat arched, hindmargin rather obliquely rounded; veins 3 and 4 stalked, 6 out of 9, 11 free; bluish-green; a white costal streak, suffused with whitish-ochreous beneath, becoming rosy towards base and apex; markings brownish-rosy or purplish; lines rather thick, irregularly dentate, curved; first from  $\frac{1}{3}$  of costa to  $\frac{1}{3}$  of inner margin; second from  $\frac{1}{3}$  of costa to  $\frac{2}{3}$  of inner margin, dilated beneath; a small discal spot; a row of cloudy irregular hindmarginal spots, connected on margin, a larger one on anal angle touching second line: cilia brownish-rosy. Hindwings with hindmargin somewhat rounded, bent on vein 4; 3 and 4 short-stalked; colour, hindmarginal spots, and cilia as in forewings; a series of three cloudy spots from middle of costa to before middle of inner margin; a larger irregular discal spot beyond middle; second line from before apex to  $\frac{1}{3}$  of inner margin, curved outwards and obsolete in middle, coalescing more or less with hindmarginal spots.

Melbourne, Victoria; one specimen (Coll. Lucas). Guénée's description is said to be from a ♂; his figure is good, but description not very clear. The description given above is incomplete, owing to the single specimen seen being in imperfect condition.

69. *Iod. exoterica*, n. sp.

♀. 29 mm. Head ferruginous, lower margin of face, fillet, and back of crown white. Palpi ferruginous, base whitish, terminal joint moderately long. Antennæ white, ringed with fuscous. Thorax green, patagia ochreous, tips white. (Abdomen broken.) Legs ochreous, ringed with white. Forewings with costa moderately arched, hindmargin obliquely rounded; veins 3 and 4 from a point, 6 out of 9, 10 touching 12 at a point, 11 running into 12; bright green, with semitransparent whitish longitudinal streaks in cell and between veins; a bright ochreous costal streak; first line represented by a short white erect streak on inner margin at  $\frac{2}{3}$ , edged with dark reddish-brown; a transverse dark reddish-brown white-centred discal spot, preceded by a short longitudinal dark reddish-brown streak; second line almost straight, from costal streak at  $\frac{3}{4}$  to inner margin at  $\frac{1}{4}$ , dark reddish-brown, containing a very fine white line; a moderate dark reddish-brown hindmarginal fascia, attenuated to a point at apex, containing a paler submarginal cloudy line, and darker hindmarginal lunules: cilia fuscous-reddish, base whitish. Hindwings with hindmargin unevenly rounded, bent on vein 4; 3 and 4 stalked; colour, discal spot and streak, and cilia as in forewings; second line and hindmarginal fascia similar, but merged together so as to form a moderately broad hindmarginal band containing a white line near its anterior edge.

Newcastle, New South Wales: one specimen (Australian Museum). This species may not be a true *Iodis*; it is the only species of the genus known to me in which vein 11 of the forewings runs into 12, and the facies is also peculiar, but in the absence of the ♂ it is of course impossible to decide with certainty.

70. *Iod. boisduvalaria*, Le G.

(*Geometra boisduvalaria*, Le G., Rev. Zool. 1841, 257;  
*Chlorodes mirandaria*, Gn. ix, 379, pl. v, 7.)

♂♀. 30 mm. Head green, fillet white. Palpi with terminal joint moderate. Antennae white. Thorax green, becoming white posteriorly, hairy beneath. Abdomen white. Femora hairy beneath. Forewings with costa gently arched, slightly sinuate, hindmargin rather oblique, hardly rounded; 3 and 4 separate, 6 out of 9, 11 appressed to 12 at a point; green; a ferruginous streak, margined with white, along inner margin from base to  $\frac{1}{2}$ , apex attenuated; first line moderately strong, white, from before  $\frac{1}{3}$  of costa to  $\frac{2}{5}$  of inner margin; a white transverse linear mark in disc; second line white, from  $\frac{2}{3}$  of costa to before anal angle, sending a tooth inwards in middle and another near inner margin; an inwards-curved white line from apex to hindmargin above anal angle, space between this and second line reddish-fuscous on dorsal half, mixed with ferruginous at its extremities: cilia reddish-

Thorax white, anterior margin green. Abdomen white, base green. Forewings yellowish-green; costa narrowly white from  $\frac{1}{4}$  to  $\frac{1}{2}$ ; a triangular white spot on base of wing; a dark reddish-fuscous discal dot at  $\frac{2}{3}$ , surrounded by a whitish ring; lines slender, white; first from beneath costa at  $\frac{1}{4}$  to inner margin at  $\frac{1}{3}$ , angulated below middle; second from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, upper half rather dentate, angulated at  $\frac{3}{4}$  from costa; a subterminal white line from apex to anal angle, touching hindmargin in middle, each half rather curved inwards; space between second and subterminal lines suffused with whitish from near costa to below middle; a white semicircular anal blotch, speckled with reddish, anteriorly bounded by second line; a white hindmarginal line, marked with fine black dots on veins, one in middle and two on anal angle more distinct: cilia whitish, towards base pale greenish. Hindwings with hindmargin obtusely bent; yellowish-green; second and subterminal lines white, subdentate, strongly curved, towards lower extremity merged in a large clear white anal blotch; a white blotch, partly irrorated with reddish, extending on upper half of wing from second line to hindmargin, marked with a dark reddish somewhat inwards-curved fascia from apex of wing to middle of hindmargin, where it is dilated; a hindmarginal series of elongate blackish marks; cilia round apex white sprinkled with reddish, thence to middle dark reddish, on lower half whitish, towards base greenish.

Brisbane, Queensland; also from India. I have described the two specimens in the British Museum, and have seen no others; there is no doubt of their identity.

72. *Iod. iosticta*, n. sp.

♂♀. 32 mm. Head green, fillet white. Palpi green, terminal joint moderate. Antennæ white. Thorax green, rather hairy beneath. Abdomen green, with a dorsal series of white dots, sides and apex white. Legs ochreous-white, anterior tibiæ greenish-tinged, posterior tibiæ in ♂ thickened, with groove containing pencil of pale yellowish hairs. Forewings with costa



gently arched, hindmargin rather oblique, gently rounded; veins 3 and 4 from a point, 6 from point with 9, 11 free; green; costal edge snow-white; first line represented by five or six irregularly placed white dots; a small white ring in disc, its interior edge margined with reddish; a series of white dots on veins from costa near apex, curved outwards on middle third, terminating in a small erect white reddish-margined spot on inner margin at  $\frac{3}{4}$ ; cilia green, barred with red on veins, with a white dot at base of each bar. Hindwings with hindmargin somewhat bent and rather projecting on vein 4; 3 and 4 short-stalked; colour, discal ring, posterior series of dots, and cilia as in forewings, but discal ring more elongate transversely.

Newcastle, New South Wales; two specimens.

73. *Iod. crossota*, n. sp.

♀. 23 mm. Face ochreous-brown, fillet whitish, crown pale

74. *Iod. saturataria*, Walk.

(*Chlorochroma saturataria*, Walk. Suppl. 1609.)

♀. 28 mm. Head light red. Palpi light red, beneath white, terminal joint long. Antennæ pale reddish. Thorax green, with a large light red posterior spot. Abdomen light red, base green. Legs white, anterior pair red. Forewings thinly scaled, green, with scattered fine obscure reddish-whitish strigulæ; costa brown-reddish, strigulated with pale reddish; a cloudy red spot on inner margin towards base; a small transverse reddish discal spot, beneath which is a reddish suffusion; second line reddish-whitish, dentate, from  $\frac{1}{4}$  of costa to  $\frac{3}{4}$  of inner margin: cilia light red, with a pale basal line. Hindwings with colour, strigulæ, second line, and cilia as in forewings.

Probably from Queensland; described from the British Museum type.

75. *Iod. metaspila*, Walk.

(*Comibæna metaspila*, Walk. 580.)

♀. 32 mm. Head green, margins of eyes white. Palpi with terminal joint moderately long. Thorax green, with brown-reddish posterior spot. Abdomen reddish or whitish, base green. Anterior tibiæ and tarsi rosy, ringed with white. Forewings thinly scaled, green, with numerous obscure whitish strigulæ; costa reddish-brown, strigulated with red-whitish; an obscure pale reddish spot on inner margin before middle; second line slender, whitish, dentate: cilia brown-reddish, barred with green. Hindwings with colour, second line, and cilia as in forewings.

Probably from Queensland; two specimens in British Museum.

76. *Iod. insperata*, Walk.

(*Thalassodes insperata*, Walk. 555.)

♂. 27 mm. Head green, fillet and lower half of face white. Palpi greenish-fuscous, beneath white, terminal joint moderately

long. Antennæ white, spotted with dark fuscous, pectinations 2 $\frac{1}{2}$ . Thorax green, with a white posterior spot, hairy beneath. Abdomen white, more or less green on back. Legs white, anterior tibiæ and tarsi banded with dark fuscous, posterior tibiæ with groove containing pencil of hairs. Forewings with costa moderately arched, hindmargin rounded, rather oblique; veins 3 and 4 separate, 6 separate, 11 free; bright green, rather thinly scaled: costa except at base white irrorated with dark fuscous; line slender, white; first from  $\frac{1}{2}$  of costa to  $\frac{2}{3}$  of inner margin, slightly curved, rather irregular; second from  $\frac{3}{4}$  of costa to  $\frac{3}{4}$  of inner margin, slightly curved, tending to emit short linear teeth posteriorly on veins, forming a small spot on costa and a larger dilated spot towards inner margin; a subterminal series of irregular white marks; a hindmarginal series of white dots: cilia white, basal half green with white apical and median dots, on costa grey. Hindwings with hindmargin rounded, with an obtuse triangular projection on vein 4; veins 3 and 4 from a point or

fuscous interrupted hindmarginal line : cilia pale whitish-fuscous. Hindwings formed as in ♂ ; colour, second line, hindmarginal band and line, and cilia as in forewings.

Newcastle, New South Wales ; Melbourne, Victoria ; George's Bay, Tasmania ; in January, not uncommon locally. The larva is 10-legged, rough, brown ; segments 4-11 with very large flattened obliquely rising projections on each side of back, these sometimes green ; a white spot on side of 11th segment : it feeds on *Exocarpus cupressiformis*. This curious larva was shown me by Mr. Kershaw, and is familiar to the Melbourne entomologists. The extraordinary dissimilarity between the sexes in the case of this and the following species is very curious ; I am not aware of the purpose served by it, but the differences are quite analogous in the two species.

77. *Iod. pieroides*, Walk.

(*Comibaena pieroides*, Walk. 580 ; *Thalassodes scitissimaria*, ib. 1564 ; *Comibaena calcinata*, Feld. pl. cxxvii, 23.)

♂. 32 mm. Head white, mixed with blue-green. Palpi blue-green, beneath white, terminal joint moderately long. Antennæ white, pectinations  $2\frac{1}{2}$ . Thorax and abdomen white, closely mixed with blue-green. Legs white, anterior tibiæ and tarsi banded with fuscous, posterior tibiæ with groove including pencil of hairs, apical projection unusually long. Forewings with costa gently arched, hindmargin waved, rather obliquely rounded ; veins 3 and 4 separate, 6 from a point with 9, 11 free ; blue-green, thinly scaled, with numerous scattered short white transverse strigulae, closest towards base ; posterior half of costa suffused with white and irrorated with brownish ; lines moderately broad, fascia-like, white ; first from  $\frac{1}{3}$  of costa to  $\frac{2}{3}$  of inner margin, closely followed by a white discal spot touching costa ; second from  $\frac{3}{4}$  of costa to  $\frac{3}{4}$  of inner margin, slightly curved, double, margins subdentate : cilia whitish, basal half green. Hindwings with inner margin long, hindmargin rounded, crenulate, bent on

vein 4; veins 3 and 4 short-stalked; colour and markings as in forewings, but strigulae on median area more scanty and dot-like, interspace of second line with a small ferruginous mark beneath costa.

♀. 38 mm. Head ferruginous, forehead green. Thorax green, with a quadrate ferruginous posterior spot. Forewings with groundcolour and strigulae as in ♂; markings ferruginous strigulated with paler; a costal streak, dilated and extending to inner margin at base; first line as a narrow very irregular fascia from  $\frac{1}{4}$  of costa to  $\frac{1}{2}$  of inner margin; a short transverse spot from costa before middle; a moderately broad hindmarginal band, containing a green spot towards costa near its anterior edge, anterior edge sinuate below costa and rather deeply concave below middle: cilia light fuscous-grey, with paler median and terminal lines. Hindwings with transverse vein margined with ferruginous; hindmarginal band as in forewings, but green spot almost obsolete.

*Uperus* and *Basilus* Queensland: several specimens. *Ma*

forewings ; a very obscure whitish line from  $\frac{2}{5}$  of costa to vein 2 at  $\frac{3}{4}$ , thence angulated and proceeding, twice waved, to inner margin at  $\frac{3}{4}$ .

Queensland ; one specimen (Coll. Lucas). Also from New Guinea.

#### 10. AGATHIA, Gn.

Face smooth. Antennæ in ♂ filiform, minutely ciliated. Palpi moderately long, second joint shortly rough-scaled, terminal joint elongate, cylindrical. Posterior tibiæ with all spurs present. Forewings with veins 3 and 4 separate, 6 almost from point with 9, 10 out of 9, 11 free. Hindwings with veins 3 and 4 separate, 6 and 7 from a point.

A small Indo-Malayan genus, of which the species are at the same time variable and closely-allied.

#### 79. *Ag. asterias*, n. sp.

♂♀. 34-36 mm. Head, palpi, antennæ, and thorax dark fuscous-reddish mixed with whitish ; back of crown, anterior half of thorax and a posterior spot green. Abdomen reddish-ochreous mixed with whitish. Legs ochreous-white. Forewings with costa moderately arched, hindmargin slightly rounded, oblique ; bright yellowish-green ; markings fuscous-reddish, mixed with whitish and margined with darker ; a narrow basal fascia ; a moderate costal streak, irrorated with dark grey, indented beyond basal fascia ; a moderate or rather narrow slightly curved fascia from  $\frac{2}{5}$  of costa to middle of inner margin, constricted above and below middle ; a hindmarginal band, broad towards costa and containing in upper half a variable irregular-oval green blotch not touching margins, more or less strongly narrowed on lower half, anterior edge sinuate, indented above middle ; sometimes one or two whitish spots indicated on hindmargin below middle ; a blackish irregular hindmarginal line, sometimes nearly obsolete : cilia whitish-ochreous. Hindwings with hindmargin rounded, unevenly

waved, projecting into a sharp triangular tooth on vein 4; colour, hindmarginal band, and cilia as in forewings; hindmarginal projection dark reddish, surmounted by a small clear white spot.

Cape York and Cooktown, Queensland; Port Darwin, North Australia; several specimens (Coll. Macleay and Brit. Mus.). Differs from *A. carissima*, Butl., (Japan) by presence of white spot above projection of hindwings, and by median fascia (representing first line) of forewings not being connected with the hindmarginal band on inner margin.

#### 11. *HELIOMYSTIS*, n. g.

Palpi moderate, porrected, second joint densely rough-haired beneath, terminal joint rather short, obtuse. Antennae in ♂ bipectinated almost to apex. Thorax posteriorly crested, beneath densely hairy. Abdomen with strong dorsal cresta. Posterior tibiae in ♂ somewhat dilated, grooved, all spurs present. Forewings with veins 3 and 4 separate, 6 from point with 9-10 free,

costa to  $\frac{3}{4}$  of inner margin, strongly acutely angulated in middle, upper half straight, lower half curved inwards, below middle twice dentate outwards; a very fine acutely dentate white subterminal line, nearly obsolete on lower half; three short longitudinal black streaks between veins above middle, cut by subterminal line, terminating in hindmargin, and a fourth less distinct similar streak above anal angle; hindmargin elsewhere with black dots between veins: cilia light brown, reddish-tinged, sprinkled with whitish. Hindwings with hindmargin crenate, tolerably rounded, slightly bent in middle; bright orange; a dark grey transverse linear discal spot; a moderately broad light brown hindmarginal band, irrorated with blackish-grey, anterior margin and towards costa almost wholly suffused with blackish, anterior margin angularly emarginate above middle; a hindmarginal series of blackish crescentic marks; cilia light brown, reddish-tinged.

Victoria; one specimen (Coll. Lucas).

## 12. CRYPSIPHONA, n. g.

Palpi moderate, obliquely ascending, second joint roughly scaled, terminal joint rather or very short. Antennæ in ♂ bipectinated, towards apex filiform. Thorax and femora densely hairy beneath, thorax sometimes crested in front. Posterior tibiæ in both sexes without middle-spurs; in ♂ with groove containing pencil of hairs. Forewings with veins 3 and 4 separate, 6 separate or out of 9, 10 out of 9, 11 anastomosing with 12 and then with 10. Hindwings with veins 3 and 4 separate, 6 and 7 separate.

A. Face black ..... 83. *occultaria*.

B. Face not black ... ..

a. Forewings with black markings..... 81. *melanosema*.

b. Forewings without black markings..... 82. *amaura*.

### 81. *Cryps. melanosema*, n. sp.

♂♀. 29-34 mm. Head grey-whitish irrorated with grey. Palpi white, suffused with dark grey towards apex, terminal joint short.



Antennae grey-whitish, in ♂ pectinated to near apex, pectinations a 2, b  $2\frac{1}{2}$ . Thorax grey-whitish suffused with fuscous-grey, crest small, black in front. Abdomen grey-whitish, with a few dark grey scales, and sometimes a fuscous-grey dorsal streak. Legs dark fuscous, ringed with whitish, posterior tibiae suffused with whitish. Forewings rather elongate-triangular, costa gently arched, hindmargin obliquely rounded; grey-whitish, irregularly suffusedly mixed with pale greyish-fuscous, and with a few scattered black scales; a short black mark on middle of base; lines black, tolerably strong, tending to be interrupted; first from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, unevenly curved outwards; second from before  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, dentate, sinuate inwards below middle; a very oblique transverse-linear black discal spot, lower extremity terminating in a whitish ill-defined spot which reaches and interrupts second line; an indistinct pale strongly dentate subterminal line, preceded and followed by darker shades; a hindmarginal row of black dots between veins: cilia whitish, with a faint grey line, and sometimes light reddish-grey spots on

obscure fuscous transverse bar; thorax with small anterior crest. Palpi fuscous, beneath white towards base, terminal joint moderately short. Legs whitish, irrorated with ochreous, anterior pair suffusedly banded with grey. Forewings rather elongate-triangular, costa gently arched towards base, hindmargin obliquely rounded, waved; very pale whitish-ochreous, faintly reddish-tinged, irrorated with grey; lines not traceable, except a faint whitish dentate subterminal; a very obscure oblique transverse-linear grey discal spot; a hindmarginal row of blackish-grey dots between veins: cilia whitish, towards base reddish-tinged. Hindwings with hindmargin rounded, crenate, inner margin long; colour, discal spot, hindmarginal dots, and cilia as in forewings, but groundcolour paler towards base; a very obscure cloudy grey line at  $\frac{3}{4}$ . Forewings beneath whitish, suffused with pale reddish except in middle of disc, at apex, and towards inner margin; a small black discal spot; a rather larger blackish spot near hindmargin above middle. Hindwings beneath whitish; a small black discal spot; a large transverse-oval blackish blotch at  $\frac{3}{4}$ , not reaching margins, surrounded by a pale reddish suffusion.

Albany, West Australia; in September and October, two specimens on fences.

### 83. *Cryps. occultaria*, Don.

(*Phalaena occultaria*, Don., Ins. N. Holl. 36; *Hypochroma occultaria*, Gn. ix, 281.)

♂♀. 32-40 mm. Head and thorax light grey, face black; thorax not crested. Palpi whitish, apex grey, terminal joint very short. Antennæ pale grey, in ♂ pectinated to  $\frac{2}{3}$ , pectinations a3, b4. Abdomen grey-whitish, irrorated with dark grey, in ♂ margined with dense yellowish-tinged hairs. Legs dark grey, posterior tibiae whitish. Forewings broad, costa hardly arched, hindmargin waved, obliquely rounded; pale whitish-grey, finely irrorated with dark grey; lines slender, dark fuscous, partially interrupted or obscure, dentate; first from  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin; second from  $\frac{2}{3}$  of costa to  $\frac{3}{4}$  of inner margin, at first

perpendicular to costa, below middle abruptly curved round to beneath discal spot, and again sharply curved to inner margin; a long transverse-linear dark fuscous discal spot; a pale cloudy waved subterminal line, preceded and followed by darker shades; a series of dark fuscous dots on hindmargin between veins: cilia grey-whitish, with a faint greyish line. Hindwings with hindmargin rounded, crenate, inner margin long; colour and markings as in forewings, but first line absent, second obsolete towards inner margin. Forewings beneath whitish, with two spots before middle, a median spot, and a posterior series, confluent on upper half, blackish; a triangular space below middle from median spot to posterior series whitish-ochreous; a crimson transverse mark near before upper half of posterior series; an ochreous-grey hindmarginal fascia, its anterior edge dentate. Hindwings beneath whitish; sometimes a crimson transverse-linear discal spot; an ochreous-grey hindmarginal fascia; preceded first by a blackish and then by a dull crimson fascia.

Var. *a*. — Crimson markings of undersurface obsolete.

of hairs, all spurs present. Forewings with veins 3 and 4 separate, 6 separate or out of 9, 10 out of 9, 11 anastomosing with 12 and then with 10 or sometimes free. Hindwings with veins 3 and 4 separate, 6 and 7 separate or rarely stalked.

A genus of moderate size, characteristic of the Indo Malayon and Australian regions. It is generally distinguishable from *Iodis* by the separation of veins 6 and 7 of the hindwings, but in the case of the aberrant species *W. paratorna* only by the palpi, which are densely rough-scaled above and beneath. The neural variation within the genus is analogous to that occurring in *Iodis*.

- |  |                            |
|--|----------------------------|
| 1. Hindwings discolorous with forewings ...                      | 2.                         |
| Hindwings concolorous with forewings...                          | 3.                         |
| 2. Forewings greenish .....                                      | 87. <i>metarhodata</i> .   |
| Forewings grey .....   | 85. <i>paratorna</i> .     |
| 3. Wings greenish .....  | 4.                         |
| Wings not greenish.....  | 7.                         |
| 4. Forewings with blackish band beyond second line .....         | 90. <i>emiliaria</i>       |
| Forewings without blackish band beyond second line .....         | 5.                         |
| 5. Discal spot of forewings linear .....                         | 91. <i>muscaria</i>        |
| Discal spot of forewings not linear.....                         | 6.                         |
| 6. First line of forewings strongly indented beneath costa ..... | 89. <i>acanthina</i>       |
| First line of forewings almost straight.                         | 88. <i>hypochromaria</i>   |
| 7. Hindwings with three much stronger hindmarginal teeth. ....   | 84. <i>W. laevi</i>        |
| Hindwings with teeth nearly equal short                          | 8.                         |
| 8. Discal spot of hindwings bent ...                             | 93. <i>orbata</i>          |
| Discal spot of hindwings straight                                | 9.                         |
| 9. Second line of forewings moderately curved. ..                | 10                         |
| Second line of forewings not curved                              | 86. <i>perconnetaria</i> . |
| 10. Wings densely irrorated with blackish-grey                   | 92. <i>testaria</i> .      |
| Wings not irrorated with blackish-grey                           | 84. <i>venaria</i>         |

84. *Hyp. Wilsoni*, Feld.*(Hypochroma Wilsoni*, Feld. pl. cxxv, 4.)

♀. 44 mm. Head, antennae, thorax, abdomen, and legs whitish somewhat mixed with blackish, abdomen with two obscure darker dorsal lines. Palpi dark grey, towards base white, terminal joint moderate. Forewings rather elongate-triangular, costa hardly arched, hindmargin rather obliquely rounded, crenate; veins 5 and 6 closely approximated at origin, 11 anastomosing with 12 and then with 10; grey, densely irrorated with white; veins partially marked with blackish; lines very obscure, slender, grey: first from  $\frac{1}{8}$  of costa to  $\frac{1}{3}$  of inner margin, curved, thrice very acutely dentate; second from  $\frac{2}{3}$  of costa to middle of inner margin, straight, very acutely dentate, teeth forming black dots on veins; a cloudy grey transverse discal spot; a very indistinct dentate white subterminal line; a hindmarginal series of wedge-shaped black dashes between veins; cilia whitish. Hindwings with hind-

hindmargin rounded, waved, rather oblique; vein 6 from point with 9, 11 anastomosing with 12 and then with 10; brownish, very finely irrorated with whitish towards posterior half, and with short scattered dark fuscous transverse strigulæ; a blackish narrow-oblong longitudinal blotch extending from base of costa to first line below middle; lines slender, black, well-defined, slightly irregular; first from before  $\frac{1}{4}$  of costa to  $\frac{2}{3}$  of inner margin, straight; a fine transverse linear blackish discal spot; second line from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, lower third forming a strong angular indentation inwards to beneath middle of disc; a series of blackish-fuscous very irregular more or less confluent spots from costa before apex to before anal angle, sinuate inwards so as to touch second line above middle; an interrupted black hindmarginal line: cilia pale brownish, finely irrorated with whitish. Hindwings with hindmargin strongly unevenly rounded, prominent below middle, crenulate; veins 6 and 7 stalked; fuscous-whitish; a transverse linear fuscous discal spot; a rather broad fuscous hindmarginal band, containing one or two small darker spots above middle, and some dark strigulæ towards anal angle; hindmarginal line and cilia as in forewings. Forewings beneath fuscous-whitish, with a dark fuscous discal spot, and a suffused fuscous spot on costa towards apex. Hindwings beneath whitish, sprinkled with fuscous, with a narrow transverse blackish discal spot, and a large blackish transverse oval posterior blotch, almost reaching margins.

South Australia; one specimen, without further record.

86. *Hyp. percomptaria*, Gn.

(*Hypochroma percomptaria*, Gn. ix, 280, pl. vi, 4.)

♂. 44 mm. Head, thorax, abdomen, and legs white mixed with black and brown, thorax with two parallel posterior transverse blackish lines. Palpi black, towards base white beneath. Antennæ dark grey mixed with white. Abdomen with small crests. Forewings broad, costa hardly arched, hindmargin obliquely rounded, waved; 6 separate, 11 free; white, slightly

brownish-tinged, densely irrorated with grey and black; a black almost basal transverse line; a straight black line from  $\frac{1}{2}$  of costa to  $\frac{1}{2}$  of inner margin, followed by a pale brownish-grey band; a short black transverse linear discal spot; second line black, somewhat waved irregularly, from  $\frac{1}{2}$  of costa to  $\frac{2}{3}$  of inner margin, followed by a pale line, beyond which the posterior area is wholly suffused with pale brownish, except a pale subdentate subterminal line; a black hindmarginal line: cilia whitish, obscurely spotted with grey. Hindwings with hindmargin unevenly crenate, inner margin long; veins 6 and 7 separate; colour and markings as in forewings, but subbasal and first lines absent. Undersurface of both wings white sprinkled with grey, with a broad cloudy blackish posterior fascia, constricted in middle, tinged with red on margins, on forewings only reaching from near costa to below middle.

Newcastle, New South Wales; Melbourne, Victoria; Albany, West Australia; three specimens. In one specimen vein 6 of the forewings was furcate at base so as to form a small areolet

very near base ; lines narrow, black, slightly irregular, somewhat interrupted ; first from  $\frac{1}{5}$  of costa to  $\frac{2}{5}$  of inner margin, posteriorly suffused with dark grey, which forms a blotch on inner margin reaching second line ; a white suffusion in disc, surrounding an irregular transverse discal spot mixed with blackish ; second line from  $\frac{2}{5}$  of costa to  $\frac{3}{5}$  of inner margin, strongly angulated outwards in middle but angle subtruncate, upper half almost straight, lower half slightly sinuate, followed on costa and inner margin by suffused white spots, and above angle by a small reddish spot ; a fine dentate white subterminal line, preceded by a dark grey suffusion, indicated, but only distinct towards costa ; a suffused grey hindmarginal blotch above, and another below middle ; an interrupted black hindmarginal line : cilia whitish, towards base greenish, barred with dark grey on veins. Hindwings with hindmargin rounded, crenate ; veins 6 and 7 separate ; pale whitish-rosy, dorsal third except a marginal streak pale greenish, with numerous short dark grey transverse strigulae ; an obscure grey discal spot ; a moderate suffused grey hindmarginal band, hardly extending to margins ; cilia on upper half whitish-rosy, on lower half light green, barred with dark grey, tips whitish.

Newcastle and Sydney, New South Wales ; in September, three specimens. Mr. G. Masters informs me that he once took the species in abundance on the stems of *Leptospermum*.

88. *Hyp. hypochromaria*, Gn.

(*Cleora hypochromaria*, Gn. ix, 234.)

♀. 34-35 mm. Head and thorax light olive-greenish ; face with a fuscous bar ; shoulders with a black spot. Palpi greenish-whitish, apex of basal joint, an apical band of second, and terminal joint except apex blackish, terminal joint moderate. Antennae ochreous-whitish, spotted with grey towards base. (Abdomen broken.) Legs ochreous-whitish, anterior pair banded with blackish, middle pair dotted with dark grey. Forewings moderate, costa hardly arched, faintly sinuate, hindmargin



rounded, crenulate, rather oblique; 6 from point with 9, 11 free; olive-greenish, somewhat mixed with whitish, and with a few fine scattered darker scales; an incomplete blackish line very near base; lines well-defined, black, subdentate; first from  $\frac{1}{4}$  of costa to  $\frac{1}{2}$  of inner margin, nearly straight; a narrow oval transverse discal spot outlined with black; second line from  $\frac{2}{3}$  of costa to middle of inner margin, rectangularly bent outwards in middle, somewhat sinuate inwards near inner margin; a faint paler dentate subterminal line, margined anteriorly by an incomplete series of blackish marks; a hindmarginal series of black crescentic marks: cilia light olive-greenish, barred with blackish, tips whitish. Hindwings with hindmargin rounded, crenate; 6 and 7 separate; colour, second and subterminal lines, hindmarginal marks, and cilia as in forewings, but bend of second line below middle; discal spot rather oblique, transverse-linear, black. Undersurface of both wings pale whitish-ochreous, with strong blackish lines placed as above; discal spot of forewings sinuate oval of hindwings dentate

and irrorated with black; costa spotted with black and whitish; veins partially lined with whitish-rosy; a blackish line near base; lines black, somewhat irregular, interrupted; first from  $\frac{1}{4}$  of costa to  $\frac{1}{2}$  of inner margin, somewhat curved, beneath costa sharply indented inwards and then outwards; an irregular transverse-oval discal spot outlined with blackish; second line from  $\frac{2}{3}$  of costa to middle of inner margin, upper  $\frac{2}{3}$  moderately curved outwards; a hardly paler dentate subterminal line, margined anteriorly by a blackish-grey shade; a hindmarginal row of black spots: cilia green, barred with dark fuscous, tips whitish. Hindwings with hindmargin rounded, crenate; 6 and 7 separate; colour, second and subterminal lines, hindmarginal spots, and cilia as in forewings; a cloudy blackish narrow transverse discal spot. Forewings beneath pale whitish-ochreous; first and second lines as above, blackish-grey; an oval blackish discal spot; a narrow blackish-grey subterminal band; hindmarginal space strigulated with blackish-grey, except on a round pale spot below middle. Hindwings beneath with colour, second line, and subterminal band as in forewings; a small grey discal spot.

Duaringa, Queensland; two specimens received from Mr. G. Barnard.

90. *Hyp. emiliaria*, Gn.

(*Hypochroma emiliaria*, Gn. ix, 280.)

“♂. 40 mm. Wings strongly toothed, mixed with flesh-colour and greenish-grey, irrorated with black, with the ordinary lines black, well-defined; second line of forewings followed by a broad charcoal-black space cut by the subterminal line, which forms interrupted flesh-coloured teeth. The black colour appears also at the base of all the wings, and in the hindwings extends along the three lower veins to their extremity. The hindwings have a series of raised crests not far from their base, and a lower crest along the abdominal margin, which is fringed with bright yellow hairs, as are also the sides of the abdomen. Undersurface white, with the

base of the hindwings broadly yellow, and a broad entire black border; forewings with an oval black discal spot. Abdomen depressed, densely haired on sides, with bifid crests."

The above description is translated from Guénée, who only quotes Australia as a locality; I have seen no specimen at all agreeing with it, but it would appear to denote a handsome and conspicuous species.

91. *Hyp. muscosaria*, Gn.

(*Hypochroma muscosaria*, Gn. ix, 281, pl. vi, 3; *H. emiliaria*, Walk (nec Gn.) 441; *H. estraria*, Feld. pl. cxxv, 7; *H. squamata*, ib. pl. cxxvi, 14.)

♀. 40 mm. Head and thorax pale green, sprinkled with black. Palpi fuscous, towards base whitish, basal joint with a black apical dot, terminal joint moderate, rather slender. Antennae ochreous-whitish, obscurely ringed with dark fuscous. Abdomen ochreous-whitish sprinkled with black without defined crests.

second and subterminal lines somewhat roughened partially with raised scales. Under-surface of both wings ochreous-whitish, in disc white; a broad blackish-grey submarginal band, in forewings containing an incomplete subterminal series of white dots; discal spot black, in forewings rather large, oval, in hindwings transverse-linear.

Newcastle, Sydney, and Mount Kosciusko (2700 feet), New South Wales; in November and January, several specimens.

92. *Hyp. deteriorata*, Walk.

(*Hypochroma deteriorata*, Walk. 441.)

♂♀. 29-32 mm. Head and thorax mixed with light ferruginous-reddish and whitish; face with two black spots; patagia barred with black. Palpi blackish mixed with white and reddish, towards base whitish. Antennæ dark grey, pectinations 4. Abdomen grey-whitish, irrorated with black, and mixed with reddish. Legs dark grey, ringed with whitish, posterior pair whitish. Forewings broad, costa slightly arched, hindmargin rather obliquely rounded, waved; 6 separate, 11 anastomosing with 12 and then with 10; light fuscous-grey, closely mixed with light ferruginous-reddish and irrorated with black, and somewhat sprinkled with white; some raised scales towards base; lines blackish-grey, dentate; first from  $\frac{1}{3}$  of costa to  $\frac{2}{3}$  of inner margin, rather curved; an ill-defined blackish-grey transverse linear discal spot; second line from  $\frac{2}{3}$  of costa to beyond middle of inner margin, upper  $\frac{2}{3}$  moderately curved outwards; a cloudy whitish dentate partially interrupted subterminal line; a hindmarginal row of blackish dots: cilia light reddish, basal half barred with dark grey. Hindwings with hindmargin rounded, crenate; 6 and 7 separate; colour and markings as in forewings, but first line obsolete; some transverse tufts of raised scales at  $\frac{1}{3}$ . Forewings beneath pale whitish-fuscous, mixed with reddish beneath costa; a white discal

blotch, containing a round black discal spot; a fuscous-grey hindmarginal band, darker anteriorly, containing a series of white dots. Hindwings beneath pale whitish-fuscous; a small blackish discal spot; a fuscous-grey hindmarginal band, darker anteriorly.

Sydney, New South Wales; in October, several specimens.

93. *Hyp. erebata*, Walk.

(*Hypochroma erebusata* (rect. *erebata*), Walk. 443.)

♀. 50 mm. Head, thorax, and abdomen pale greyish-ochreous irrorated with black; face black, somewhat tufted. Palpi grey irrorated with black, towards base ochreous-whitish. (Antennae broken.) Legs greyish-ochreous irrorated with black, posterior pair whitish-ochreous. Forewings moderate, costa slightly arched, hindmargin rather obliquely rounded, waved; 6 separate, 11 anastomosing with 12 and then with 10; pale greyish-ochreous, closely strewn with short grey transverse strigulae, and with some scattered black scales: some raised scales towards base; line

94. *Hyp. orenaria*, Gn. .

(*Hypochroma crenaria*, Gn. ix, 278, Walk. 432; *H. distenta*, Walk. 434; *H. sublimbata*, Butl., Ann. Mag. Nat. Hist. 1882, 232; *H. paulinaria*, Pag., Jahrb. Nass. Ver. 1885, 47, pl. I. 1.).

♀. 42 mm. Head, antennæ, and thorax pale whitish-ochreous, face with a black bar. Palpi white, terminal joint long, slender, ochreous-tinged. Abdomen white, with a few whitish ochreous scales. Legs dark grey ringed with white (posterior pair broken). Forewings broad, costa slightly arched, hindmargin rounded, waved, somewhat oblique; 6 separate, 11 anastomosing with 10; white, irrorated with pale ochreous; first line slender, ochreous, from a grey mark on costa at  $\frac{1}{4}$  to  $\frac{1}{3}$  of inner margin, thrice angularly dentate; a long transverse linear grey or ochreous discal spot; second line slender, grey, mixed with ferruginous-reddish, more ochreous towards inner margin, from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, waved-dentate, tolerably evenly curved; space between second line and hindmargin more densely irrorated with ochreous and some reddish scales, sometimes greyer towards costa, except a cloudy dentate whitish subterminal line; a fine ferruginous sometimes interrupted hindmarginal line, tending to form dots with one or two black scales between veins: cilia white, with faint very pale ochreous-greyish bars. Hindwings with hindmargin rounded, crenulate, inner margin long; 6 and 7 separate; colour and markings as in forewings, but first line absent, discal spot ochreous, indistinct, second line more ferruginous, cilia not barred. Forewings beneath white, costa yellowish towards base; a narrow transverse black discal spot; a broad blackish subterminal band, connected with hindmargin above middle by an oblong patch. Hindwings beneath white, with subterminal band as in forewings.

Rockhampton, Queensland; two specimens. Occurs also in New Guinea and the adjoining islands, Ceylon, and India.

14. *EPIPRISTIS*, n.g.

Palpi moderate, porrected, shortly rough-scaled, terminal joint moderate or short. Antennae in ♂ dentate or filiform, ciliated ( $\frac{1}{2}$ -1). Thorax hairy beneath. Posterior tibiae in ♂ somewhat dilated, grooved, all spurs present. Forewings with veins 3 and 4 separate, 6 separate or from point with 9, 10 out of 9, 11 anastomosing with 12 and then with 10. Hindwings with veins 3 and 4 separate, 6 and 7 separate.

95. *Ep. ozycyma*, n. sp.

♂♀. 25-32 mm. Head, antennae, thorax, abdomen, and legs ochreous-whitish; face black; antennae in ♂ filiform, ciliae  $\frac{1}{2}$ ; anterior legs infuscated. Palpi white, terminal joint moderate. Forewings moderate, costa gently arched, hindmargin rather obliquely rounded; very pale whitish-ochreous, sprinkled with a few white and ochreous scales; lines slender, blackish, dentate first, scarcely dentate second, third, and fourth, more or less

grey-whitish. Forewings moderate, costa gently arched, hind-margin somewhat obliquely rounded, crenulate; rather dark purplish-fuscous; a sinuate transverse linear blackish-fuscous discal spot, mixed with crimson; second line obscurely darker, from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, curved, dentate: cilia purplish-grey. Hindwings with hindmargin rounded, crenate; colour and cilia as in forewings; a faint curved darker line beyond middle. Wings beneath grey, towards costa reddish-tinged; forewings with a suffused darker blotch on upper half of hind-margin, mixed with blackish anteriorly.

Sydney, New South Wales; in September, one specimen.

#### APPENDIX.

The following species, attributed to this family, I have not thought it necessary to include at present.

97. *Acidalia oppilata*, Walk. 776. The single specimen is in such poor condition as to be unidentifiable, being one of the obscure group of *A. recessata*.

98. *Acidalia despoliata*, Walk. 778. I could not satisfy myself that the type of this (which I formerly quoted as a synonym of *A. recessata*,) was truly referable to any species known to me; it may perhaps be an unrecognised additional species.

99. *Acidalia schistacearia*, Walk. 1609, is a species of *Dichromodes*, belonging to the *Oenochromidae*.

100. *Acidalia primaria*, Walk. 1610, is a synonym of *Idiodes apicata*, Gn. (*Boarmiidae*).

101. *Acidalia posticaria*, Walk. Suppl. 1633, is probably not of this family, but I have not been able to examine it critically.

102. *Idaea farinalis*, Ros., Ann. Mag. N.H. 1885, 402. This may or may not be an *Acidalia*; it does not seem to be sufficiently described, and I have failed to identify it.

103. *Hypochroma nyssiata*, Feld. pl. cxxv, 3, belongs to the *Bombycina* (*Liparididae*).



In the following index synonyms are indicated by *italics*.

# GENERA.

Acidalia, Tr.....	4.	Haliomystia, n.g.....	11.
Agathia, Gn.....	10.	Hypochroma, Gn.....	13.
Comostola, n.g.....	8.	Iodia, Hb. ....	9.
Crypsiphona, n.g.....	12.	Perixera, Meyr.....	1.
Dithalama, n.g.....	3.	Problepsia, Ld.....	2.
Epipristis, n.g.....	14.	Timandra, Dup.....	5.
Eucrostis, Hb.....	7.	Urolitha, n.g.....	6.

# SPECIES.

<i>acanthina</i> , n.sp.....	89.	<i>calcinata</i> , <i>Feld</i> .....	77.
<i>acidaliaria</i> , <i>Walk</i> .....	18.	<i>carenaria</i> , Gn.....	54.
<i>agnes</i> , <i>Bull</i> .....	27.	<i>carenaria</i> , <i>Walk</i> .....	55.
<i>albicosta</i> , <i>Walk</i> .....	64.	<i>centrophylla</i> , n.sp.....	51.

<i>distenta</i> , Walk.....	94.	<i>melocrossa</i> , n.sp.....	49.
<i>electrica</i> , n.sp.....	80.	<i>metarhodata</i> , Walk.....	87.
<i>emiliaria</i> , Gn.....	90.	<i>metaspila</i> , Walk.....	75.
<i>emiliaria</i> , Walk.....	91.	<i>mirandaria</i> Gn.....	70.
<i>episcia</i> , n.sp.....	30.	<i>monocyma</i> , n.sp.....	57.
<i>erebata</i> , Walk.....	93.	<i>muscosaria</i> , Gn.....	91.
<i>exoterica</i> , n.sp.....	69.	<i>neoxesta</i> , n.sp.....	15.
<i>externa</i> , Walk.....	60.	<i>neptunus</i> , Butl.....	52.
<i>farinalis</i> , Ros.....	102.	<i>nyssiata</i> , Feld.....	103.
<i>felicitata</i> , Walk.....	71.	<i>obliquissima</i> , Walk.....	42.
<i>figlinaria</i> , Gn.....	18.	<i>obturbata</i> , Walk.....	19.
<i>fugitivaria</i> , Gn.....	42.	<i>occultaria</i> , Don.....	83.
<i>gratiosata</i> , Gn.....	43.	<i>ochthaula</i> , n.sp.....	45.
<i>halmaea</i> , n.sp.....	9.	<i>ocyptera</i> , n.sp.....	62.
<i>halochlora</i> , n.sp.....	47.	<i>oppilata</i> , Walk.....	97.
<i>hypochra</i> , n.sp.....	13.	<i>optivata</i> , Walk.....	23.
<i>hypochromaria</i> , Gn.....	88.	<i>orthoscia</i> , n.sp.....	28.
<i>hypsithrona</i> , n.sp.....	39.	<i>oxycentra</i> , n.sp.....	65.
<i>inchoata</i> , Walk.....	53.	<i>oxycyma</i> , n.sp.....	95.
<i>innocens</i> , Butl.....	5.	<i>pachydetis</i> , n.sp.....	11.
<i>insperata</i> , Walk.....	76.	<i>paratorna</i> , n.sp.....	85.
<i>intacta</i> , Walk.....	42.	<i>partita</i> , Walk.....	71.
<i>intermixta</i> , Walk.....	63.	<i>paulinaria</i> , Pag.....	94.
<i>iocentra</i> , n.sp.....	36.	<i>percomptaria</i> , Gn.....	86.
<i>iosticta</i> , n.sp.....	72.	<i>perlata</i> , Walk.....	26.
<i>isomorpha</i> , n.sp.....	7.	<i>perlepidaria</i> , Walk.....	37.
<i>jessica</i> , Butl.....	17.	<i>philocosma</i> , n.sp.....	8.
<i>latilineata</i> , Walk.....	35.	<i>pieroides</i> , Walk.....	77.
<i>leucochorda</i> , n.sp.....	40.	<i>porphyropis</i> , n.sp.....	1.
<i>leucomerata</i> , Walk.....	66.	<i>posticaria</i> , Walk.....	101.
<i>ligataria</i> , Walk.....	27.	<i>prasodes</i> , n.sp.....	32.
<i>liotis</i> , n.sp.....	20.	<i>primaria</i> , Walk.....	100.
<i>lydia</i> , Butl.....	17.	<i>pseliota</i> , n.sp.....	12.
<i>meandraria</i> , Gn.....	38.	<i>pyropa</i> , n.sp.....	46.
<i>megalocentra</i> , n.sp.....	29.	<i>recessata</i> , Walk.....	22.
<i>melanosema</i> , n.sp.....	81.	<i>repletaria</i> , Walk.....	18.

<i>rhodocosma</i> , n.sp.....	67.	<i>equamata</i> , Feld.....	91.
<i>rubraria</i> , Dold.....	18.	<i>stereota</i> , n.sp.....	41.
<i>rufonigraria</i> , Walk.....	96.	<i>stipataria</i> , Walk.....	22.
<i>sancta</i> , n.sp.....	3.	<i>sublimbata</i> , Butl.....	94.
<i>saturataria</i> , Walk.....	74.	<i>sublinearia</i> , Walk.....	24.
<i>schistacearia</i> , Walk.....	99.	<i>submissaria</i> , Walk.....	55.
<i>scitissimaria</i> , Walk.....	77.	<i>vertumnaria</i> , Gn.....	59.
<i>semicrocea</i> , Walk.....	63.	<i>vulnerata</i> , Butl.....	61.
Wilsoni, Feld. ....		84.	

## SUPPLEMENT.

I add here a few new species and notes of additional localities for those families revised in my first paper. These additions are principally derived from my West Australian journey, and are remarkable for their scantiness; it would appear that West Australia possesses hardly any indigenous fauna of these families.

The full synonymy of this species is as given here.

CALLIGERIA, Dup.

*Call. melitaula*, Meyr.

(*Calligenia melitaula*, Meyr., Proc. Linn. Soc. N.S.W. 1886, 705; *Mitlochrista simulans*, Butl., Trans. Ent. Soc. Lond. 1886, 382.)

My name has three months' priority.

TERMESSA, Walk.

*Term. zonophanes*, n. sp.

♂♀. 29-31 mm. Head ochreous-yellow. Palpi and antennæ black. Thorax whitish-ochreous, anterior margin broadly blackish. Abdomen ochreous-yellow. Legs dark fuscous, posterior pair yellowish. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin rather obliquely rounded; whitish-ochreous, margins more yellowish-tinged; costal edge black on basal half; a narrow rather irregular blackish fascia from about  $\frac{1}{4}$  of costa to  $\frac{1}{4}$  of inner margin, and another from before middle of costa to middle of inner margin, connected by a line on margins, and suffusedly confluent somewhat below middle; a broad inwards-curved blackish fascia from costa about  $\frac{3}{4}$  to inner margin before anal angle, sometimes connected with preceding fascia by a bar in middle; a subtriangular blackish spot on upper half of hind margin, its apex touching middle of preceding fascia: cilia dark fuscous, above apex pale ochreous-yellowish, above anal angle broadly whitish-ochreous. Hindwings ochreous-yellow; a dark fuscous irregular fascia from costa near apex to about middle of hindmargin, thence along hindmargin to anal angle, narrow towards costa, more or less broadly dilated towards middle; a small elongate dark fuscous spot along hindmargin above middle; cilia ochreous-yellow, dark fuscous towards anal angle and opposite supra-median spot.

Wimmera, Victoria ; several specimens (Coll. Lucas). Nearest to *T. Shepherdi* ; in my tabulation it falls under the same heading with *T. gratiosa*, from which it is immediately separated by the entire fascia of hindwings.

*SOROCOSTIA*, Ros.

*Tribunta scabrata*, Walk. Suppl. 1507, appears to be a species of this genus, but is certainly not in a condition to be identified, and the name should be neglected.

*Sor. biguttalis*, Walk.

(*Tribunta biguttalis*, Walk. Suppl. 1507 ; *Sorocostia trigonata*, Meyr., Proc. Linn. Soc. N.S.W. 1886, 719.)

Identified from the original specimen.

*Sor. albalis*, Walk.

(*Hypena albalis*, Walk. Suppl. 1143 ; *Eromene vetustella*, Walk. Suppl. 1763 ; *Nola strictalis*, Z., Zool. Bot. Ver. 1872, 459, pl. ii, 3 ; *Sorocostia vetustella*, Ros., Ann. Mag. N.H. 1885, 436, Meyr., Proc. Linn. Soc. N.S.W. 1886, 721.

In looking through the British Museum collection I noticed this earlier name, involving rectification as above.

*Sor. aenictis*, n.sp.

♂. 18 mm. Head whitish, irrorated with grey. Palpi  $2\frac{1}{2}$ , grey-whitish, irrorated with grey. Antennæ and abdomen grey-whitish. Thorax grey, anteriorly mixed with whitish. Legs whitish irrorated with dark grey, posterior pair ochreous-whitish. Forewings very elongate-triangular, costa rather strongly arched, apex obtuse, hindmargin obliquely rounded ; grey, thinly sprinkled with blackish ; a small black mark on costa near base ; two fine black lines, first from  $\frac{1}{4}$  of costa to  $\frac{1}{3}$  of inner margin, unevenly curved, once shortly dentate above middle, second from beyond middle of costa to beneath costa at  $\frac{3}{4}$ , thence slightly curved to  $\frac{3}{4}$  of inner margin, irregularly dentate ; second tuft black anteriorly ; an indistinct irregularly sinuate darker grey subterminal shade ; a hindmarginal series of cloudy dark grey dots : cilia grey, sprinkled with dark grey. Hindwings very pale whitish-grey ; cilia grey-whitish.

Geraldton, West Australia ; one specimen in November. Nearly allied to *S. arachneis*, but forewings narrower, hindmargin more oblique, form of first line quite different, second tuft anteriorly black ; intermediate in character between *S. arachneis* and *S. cycota*.

*Sor. tornotis*, n. sp.

♂. 15 mm. Head whitish, sprinkled with ochreous, with a black mark on each side of forehead. Palpi 2, grey-whitish,

irrorated with ochreous and black. Antennæ and abdomen grey-whitish. Thorax grey-whitish, sprinkled with black, anteriorly irrorated with ochreous. Legs dark fuscous, apex of joints whitish. posterior tibiae whitish. Forewings elongate-triangular, costa gently arched, apex obtuse, hindmargin obliquely rounded; white, closely irrorated with greyish-ochreous and sprinkled with black: an obscure blackish strigula on costa near base; tufts pale ochreous anteriorly, second preceded by a blackish suffusion; two slender tolerably distinct black lines; first from  $\frac{1}{4}$  of costa to  $\frac{1}{4}$  of inner margin, rather irregular, curved; second waved, from a spot on costa beyond middle to beneath costa at  $\frac{3}{4}$ , thence to inner margin at  $\frac{3}{4}$ , somewhat bent in middle, rather sinuate inwards on lower half; a similar and parallel line, formed by a blackish irroration, close before second line throughout, except near costa; an irregular sinuate subterminal line, formed by a blackish irroration, tending to be interrupted into dots, dentate outwards beneath costa; a hindmarginal row of blackish dots: cilia white, irrorated with grey, basal half sprinkled with black, tending to form spots. Hind-

This genus, which has been variously placed, is certainly referable here, and is nearest allied to *Zia*. The name is usually written *Sarrothripa*, which is a meaningless barbarism ; but since Guénée always formed his names etymologically, I confidently conjecture *Sarotricha* to be the right reading, (in allusion to the peculiar tufts of the anterior legs, characteristic of the genus,) and have restored it accordingly ; as a critical emendation I consider it almost certain.

*Sar. exophila*, n. sp.

♂♀. 14-18 mm. Head, palpi, thorax, and legs white irrorated with dark fuscous. Antennæ and abdomen grey. Forewings elongate, suboblong, posteriorly rather dilated, costa strongly arched near base, slightly sinuate in middle, apex obtuse, hind-margin rounded, somewhat oblique ; white, irrorated with dark grey, somewhat mixed with greenish, sometimes more or less suffused with grey ; from two to four subdentate dark fuscous transverse lines more or less marked in basal area, sometimes partially suffused together ; two parallel blackish lines from costa before middle to middle of inner margin, almost straight, somewhat indented beneath costa, first less marked ; two minute black dots placed somewhat obliquely transversely in disc beyond middle ; two parallel waved blackish-grey lines from  $\frac{3}{4}$  of costa to  $\frac{3}{4}$  of inner margin, rather curved outwards, sinuate inwards towards inner margin, second forming a triangular dark fuscous spot on costa ; a shortly dentate blackish subterminal line, indented beneath costa and in middle ; an interrupted black hind-marginal line, tending to form dots : cilia whitish, irrorated with dark grey. Hindwings fuscous-grey, much paler and whitish-tinged towards base ; cilia white, basal half fuscous.

Duaringa, Queensland ; four specimens received from Mr. G. Barnard. Nearly allied to the European *S. undulana*, but much smaller, distinguished by the white groundcolour, the two small discal dots, and the postmedian line of forewings not angulated inwards below middle.



referable to the neighbourhood

SPILA

*Spil. fu*

The original authority described it as *Chelonia fusca* v. 4 ; I am indebted to Mr. Walker.

*Spil. G.*

(*Spilosoma Glatignyi*, Le ( *pallida*, Dbld., Eyre's Disc. Walk. Bomb. 710 ; *Spilosom* ib. Suppl. 295 ; *S. fulvohirta*, 754).

The above is an earlier synonymy.

DEL

*Deio.*

Also from Carnarvon, We

## PROCRIS, F.

*Procr. amethystina*, n. sp.

♂ 18-19 mm. Head, palpi, thorax, and abdomen brilliant metallic green-blue, somewhat mixed partially with black. Antennæ black, pectinations 5. Legs black, femora and posterior tibiae metallic blue. Forewings elongate-triangular, costa slightly arched, apex rounded, hindmargin very obliquely rounded; purple-blackish, sprinkled with metallic green: cilia blackish, tips pale grey. Hindwings elongate-ovate; blackish; disc thinly scaled, semitransparent; vein 4 absent, 3 and 5 tolerably approximated at base.

Perth, West Australia; two specimens, in November. Nearest to *P. cyanota*.

*Procr. empyrea*, n. sp.

♂ 18 mm. Head and thorax dark bronzy-fuscous, mixed with brilliant metallic coppery. Palpi black. Antennæ black, pectinations 5. Abdomen metallic-green, somewhat mixed with blackish, towards base coppery. Legs black, femora and posterior tibiae bronzy-green. Forewings elongate-triangular, costa hardly arched, apex rounded, hindmargin very obliquely rounded; blackish, with a few coppery scales. cilia grey, basal third blackish. Hindwings elongate-ovate; blackish; disc thinly scaled, becoming semi-transparent towards base; vein 4 absent, 3 and 5 approximated at base.

Albany, West Australia; one specimen bred in November. Intermediate between *P. cyanota* and *P. subdolosæ*. The larva is clothed with dense rather short hairs; reddish-brown; dorsal line white: found full-grown on a fence early in October, without indication of food-plant; it spun a rather dense cocoon.

*Procr. cuprea*, Walk.

Also from Geraldton, Perth, and York, West Australia; in October and November, abundant. In some places (especially on the eastern slope of the range towards York) this species varies

into a bronzy-green form, and is then with difficulty distinguished from *P. viridipulverulenta*; the forewings appear to show an indefinable yet perceptibly darker hindmarginal fascia, dilated towards costa, which is the best distinguishing mark of the species, but I should not be surprised if intermediate local forms were to be found presenting a complete gradation to the eastern *P. viridipulverulenta*.

NOTE.—*Themiscyra lactifera*, Walk., and *Cyptasia egregiella*, Walk., which are mentioned in the Appendix as unidentified, I have since seen and recognized to be species of *Tincina*; they may therefore be omitted from this group. *Cyptasia cristata*, Bntl., Trans. Ent. Soc. Lond. 1886, 383, referred by Butler to the *Lithosiadae*, is also a species of *Tincina*.

## DESCRIPTIONS OF AUSTRALIAN MICRO-LEPIDOPTERA.

By E. MEYRICK, B.A., F.E.S.

### XIV. OECOPHORIDAE (*continued*).

ENCHOCRATES, Meyr.

#### 520. (13a.) *Ench. phaedryntis*, n.sp.

♀. 21 mm. Head and thorax greyish-ochreous mixed with crimson. Palpi bright rosy, second joint externally grey except towards margins. Antennae crimson, apex pale greyish. Abdomen ochreous-whitish. Anterior legs crimson, middle pair whitish-ochreous, posterior pair white. Forewings oblong, moderately broad, costa considerably arched towards base, somewhat bent at  $\frac{1}{2}$ , thence almost straight, apex rounded, hindmargin somewhat oblique, rounded; bright crimson, suffusedly mixed with light ashy-grey, except on edge; a darker purple-grey cloudy line beneath costal edge; costal edge yellow on basal third; a purplish-fuscous dot in disc before middle, a second on fold slightly before first, and a third in disc at  $\frac{2}{3}$ ; an irregular indistinct slender yellowish line from third dot to  $\frac{2}{3}$  of inner margin; a moderate triangular yellow spot on costa somewhat beyond middle; a cloudy purple-grey line along hindmargin: cilia light crimson, on upper half of hindmargin pale yellow except towards base, round anal angle pale grey. Hindwings and cilia ochreous-whitish, apex of wing very faintly rosy-tinged.

Albany, West Australia; one specimen in October; very distinct. Beaten from *Eucalyptus*.

#### 521. (14b.) *Ench. soreutis*, n.sp.

♀. 21 mm. Head, palpi, and thorax pale greyish-ochreous; palpi externally slightly rosy-tinged and mixed with fuscous.



irregular longitudinal mark 1  
triangular patch extending al  
almost to anal angle, and reach  
by two very irregular transver  
of dark fuscous dots along hinc  
cilia ochreous-grey-whitish, rou  
Hindwings ochreous-grey-whiti  
tinged ; cilia ochreous-whitish.

Sydney, New South Wales  
allied to *E. picrophylla*, of whi  
it may possibly prove to be an

#### LEPIDO

To this genus is also to be r  
doubtfully as a *Piloprepes*. T  
five species :

1. Hindwings tinged with oc  
Hindwings not tinged wit
2. Forewings with groundcol  
Forewings with groundco
3. Forewings more or less rc  
Forewings not rosy-tinged

522. (15a.) *Lep. leucodetis*, n.sp.

♂♀ 16-17 mm. Head and thorax whitish-ochreous, more or less rosy-tinged. Palpi ochreous-whitish. Antennæ white. Abdomen and legs pale whitish-ochreous, anterior legs rosy-tinged. Forewings elongate, moderate, costa moderately arched, apex pointed, hindmargin concave, oblique; pale yellowish-ochreous, more or less suffused with pale rosy; a nearly straight slender white fascia from  $\frac{2}{3}$  of costa to  $\frac{2}{3}$  of inner margin, anteriorly suffusedly margined with fuscous; a fuscous dot in disc at  $\frac{2}{3}$ ; cilia whitish-ochreous, mixed with pale rosy. Hindwings and cilia pale whitish-ochreous.

Geraldton, West Australia; two specimens in November, from *Kunzea* (?).

523 (15b.) *Lep. proteis*, n. sp.

♂♀. 17-19 mm. Head, palpi, and antennæ white or whitish. Thorax greyish-ochreous or rarely white, more or less rosy-tinged. Abdomen and legs grey-whitish, anterior legs mixed with grey and pale rosy. Forewings elongate, moderate, costa moderately arched, apex pointed, hindmargin somewhat concave, rather strongly oblique; greyish-ochreous or rarely whitish, more or less strongly rosy-tinged, sometimes pale rosy irrorated with grey, or rarely wholly suffused with rather dark grey beyond first fascia; costal edge white; in whitish specimens a rosy-ochreous streak along inner margin; two straight oblique linear cloudy dark grey fasciæ, sometimes wholly absent, in white specimens more ochreous, extremities generally indistinct; first from  $\frac{1}{3}$  of costa to  $\frac{2}{3}$  of inner margin, second from  $\frac{2}{3}$  of costa to below middle of hindmargin; a blackish dot in disc at  $\frac{2}{3}$ , sometimes absent; apex often suffused with grey: cilia concolorous with wing, generally with grey apical and anal spots. Hindwings pale grey or whitish-grey; cilia grey-whitish.

Albany, West Australia; beaten commonly from *Leptospermum* on swampy flats, in December. A very variable species, but easily distinguished.

## EOCHROIA, Meyr.

524. (21a.) *Eochr. archescia*, n. sp.

♂. 17 mm. Head, palpi, antennae, and thorax light ochraceous. Abdomen and legs ochraceous-whitish, anterior legs infuscated. Forewings elongate, moderate, costa gently archer<sup>1</sup>, apex tolerably pointed, hindmargin straight, rather strongly oblique; light ochraceous, very slightly rosy-tinged; costal edge obscurely ochraceous-whitish; a grey dot in disc before middle, a second on fold obliquely beyond first, and a third in disc at  $\frac{2}{3}$ , these placed on two longitudinal streaks somewhat paler than groundcolour; an indistinct sharply angulated grey line from  $\frac{2}{3}$  of costa to before anal angle: cilia whitish-ochraceous, towards apex rosy-tinged, basal half on hindmargin rather dark grey. Hindwings and cilia grey-whitish.

Geraldton, West Australia; one specimen in November. Nearly allied to *E. dejectella*, from which it is best distinguished by the greyish-tinged hindwings, without rosy apex: also characterised by the duller colouring, grey posterior line, and different cilia.

yellow-whitish, base crimson. Thorax bright yellow-ochreous, mixed with crimson posteriorly, with a central longitudinal narrow yellow-whitish line. Abdomen whitish-ochreous, apex rosy-tinged. Legs whitish-ochreous, partly rosy-tinged, anterior pair bright crimson. Forewings elongate, moderate, costa strongly arched, apex round-pointed, hindmargin straight, oblique; bright yellow-ochreous, mixed with crimson-rosy; a crimson dot in disc at  $\frac{2}{3}$ : cilia ochreous-yellowish, somewhat mixed with pale crimson. Hindwings and cilia pale ochreous-yellowish.

Albany, West Australia; one specimen in December, beaten from *Leptospermum* on the granite hills.

#### HELIOCAUSTA, Meyr.

526. (35a.) *Hel. rhodoxantha*, n. sp.

♂. 17 mm. Head whitish-yellowish mixed with light reddish. Palpi yellow-whitish mixed with rosy, terminal joint with a blackish median band. Antennæ whitish, spotted with dark grey. Thorax reddish, irregularly spotted with whitish-yellowish. Abdomen grey, margins and apex yellowish. Legs whitish-ochreous, femora white, anterior tibiæ and tarsi red, ringed with pale yellowish. Forewings elongate, moderate, costa gently arched, apex round-pointed, hindmargin straight, rather oblique, rounded beneath; rosy-red, with a few scattered black scales; markings pale yellowish; five or six very small spots near base, tending to unite in oblique strigulæ; three very irregular somewhat curved transverse strigæ, tending to be interrupted into spots in disc, first from  $\frac{1}{5}$  of costa to near inner margin at  $\frac{2}{3}$ , second from  $\frac{2}{5}$  of costa to  $\frac{2}{3}$  of inner margin, third from  $\frac{3}{5}$  of costa to anal angle; two small spots in disc between first and second strigæ, and a series of small irregular spots between second and third; an angulated mark beneath costa near apex, and a submarginal series of dots before hindmargin except towards apex: cilia rosy-red barred with whitish-yellowish, tips wholly yellow-whitish. Hindwings bronzy-fuscous; cilia fuscous, terminal half grey-whitish.



Sydney, New South Wales; one specimen in March, beaten from *Eucalyptus*. Although apparently nearest *H. cressa*, the species is extremely distinct.

527. (37a) *Hel. mimica* n.sp.

♂♀. 19-20 mm. Head, palpi, thorax, and abdomen whitish-grey-ochreous, thorax with a few reddish-fuscaous scales. Antennae ochreous-whitish, annulated with dark fuscous. Legs pale whitish-ochreous, tarsal joints grey except at apex, anterior tibiae infuscated. Forewings moderately elongate, costa moderately arched, apex round-pointed, hindmargin straight, somewhat oblique, rounded beneath; very pale greyish-ochreous, with a few scattered fuscous-reddish scales; markings fuscous-reddish; three indistinct dots placed in an oblique series from costa near base; a slender somewhat irregular fascia from  $\frac{1}{4}$  of costa to middle of inner margin, on lower half dilated posteriorly into a subtriangular blotch, above this more or less interrupted; a moderately large dot in disc at  $\frac{3}{4}$ , connected with middle of costa by a slender irregular

blackish. Abdomen blackish-grey, apex ochreous-yellow. Legs blackish-grey, posterior pair ochreous-yellow. Forewings elongate, moderate, posteriorly somewhat dilated, costa slightly arched, apex round-pointed, hindmargin slightly sinuate, rather oblique; deep orange-yellow; a short blackish streak along base of inner margin; in ♂ a cloudy subtriangular spot of dark purple-fuscous scales on middle of inner margin, and a smaller spot in disc somewhat beyond it, in ♀ both nearly obsolete; an erect denticulate narrow dark purple-fuscous streak from anal angle reaching about half across wing; in ♂ a cloudy suffusion of dark fuscous scales along hindmargin: cilia ochreous-yellow, on anal angle dark grey. Hindwings pale ochreous-yellowish; a narrow fuscous-grey suffusion along hindmargin, and a broader suffusion along inner margin; cilia grey, above apex dark grey, on a space beneath apex suffused with pale yellowish.

Albany, West Australia; two specimens, beaten together from *Eucalyptus*, at the end of September. Intermediate between *H. hemiteles* and *H. paralyrgis*.

529. (43b.) *Hel. phylacopis*, n. sp.

♀. 25 mm. Head whitish-ochreous, face white. Palpi ochreous-whitish, faintly rosy-tinged. Antennæ rosy-whitish. Thorax very pale brownish-ochreous, with a very small purple-grey posterior spot. Abdomen whitish-ochreous. Legs ochreous-white, anterior pair rosy-tinged. Forewings moderate, costa moderately arched, apex obtuse, hindmargin straight, slightly oblique, rounded beneath; very pale brownish-ochreous; costal edge pale rosy; a rather dark purple-fuscous dot in disc before middle, a second on fold obliquely beyond first, and a small round spot in disc at  $\frac{2}{3}$ : cilia pale rosy, with a basal series of very obscure grey dots. Hindwings light ochreous-fuscous, towards costa suffused with pale yellowish except near apex; cilia greyish-ochreous, becoming grey round apex.

York, West Australia; one specimen in November. Not very near any other, but perhaps most allied to *H. triphaenatella*.

530. (45a.) *Hel. acmaea*, n. sp.

♂. 21 mm. Head and thorax whitish-ochreous, slightly brownish-tinged, face whitish. Palpi rosy-whitish, antennae whitish, base rosy-tinged. Abdomen ochreous-whitish, sides mixed with blackish-grey scales, anal tuft whitish-ochreous. Legs ochreous-whitish, anterior pair suffused with pale rosy, posterior pair white. Forewings elongate-oblong, somewhat gently arched, apex obtuse, hindmargin faintly sinuate, hardly oblique, rounded beneath; whitish-ochreous, faintly brownish-tinged; costal edge pale rosy; a small rather dark purplish-fuscous dot in disc before middle, a second on fold obliquely beyond first, and a third in disc at  $\frac{2}{3}$ ; cilia pale rosy, with a basal series of fuscous dots. Hindwings whitish-yellowish; a few fuscous scales towards hindmargin above anal angle; cilia yellow-whitish.

Mount Lofty, South Australia; one specimen received from Mr. E. Guest. Allied to *H. protocantha*, but forewings without posterior line, and apical cilia of hindwings not grey, more like

Northampton, West Australia; one specimen in November, from *Eucalyptus*. Most allied to *H. aomaea* and probably also *H. phylacopis*, but not very near either.

### EUCHAETIS, Meyr.

To the characters of this genus should be added: Hindwings with veins 3 and 4 separate at origin. This character readily separates it from *Heliocausta*, to which the discovery of the additional species recorded below shows that it is otherwise very nearly allied. The antennal ciliations of the ♂ vary specifically from 3 to 5.

#### 532. (50a.) *Euch. rhizobola*, n.sp.

. ♂♀. 31-33 mm. Head pale greyish-ochreous, face more whitish. Palpi grey-whitish, mixed with rosy. Antennæ whitish-grey, ciliations 3. Thorax pale greyish-ochreous, with a ferruginous irroration forming a diamond-shaped posterior spot, a narrow central longitudinal streak, and a small spot in middle of each patagium. Abdomen and legs pale whitish-ochreous, anterior legs rosy, middle tarsi rosy except apex of joints. Forewings rather broad, costa moderately arched, apex obtuse, hindmargin faintly sinuate, not oblique, rounded beneath; ferruginous, irrorated with very pale greyish-ochreous; markings very pale greyish-ochreous; costal edge rosy; a short streak along base of inner margin, forming a spot at base; a moderate rather irregular-edged costal streak, rather broad at base, emitting two irregular oblique wedge-shaped projections, at  $\frac{1}{4}$  and middle, first running to fold before middle, second to a whitish dot in disc at  $\frac{3}{8}$ ; three ill-defined grey-whitish dots beneath posterior half of costal streak, almost confluent with it; a grey whitish submarginal line, becoming marginal on lower half of hindmargin, anterior edge waved: cilia very pale whitish-grey, with a pale grey-reddish line beyond middle, tips whitish between apex and anal angle. Hindwings pale whitish-ochreous, yellowish-tinged, apex more ochreous-yellowish, sometimes slightly rosy-tinged; cilia yellow-whitish.

Sydney, New South Wales; seven specimens in August, at rest on a fence beneath *Eucalyptus*-trees after a gale. All these, in the finest condition, were taken the same day, and I never met with the species, which is one of the finest and most distinct of the *Occophoridae*, on any other occasion, though frequently collecting along the same fence.

533. (50b.) *Euch. iospila*, n.sp.

♀. 31 mm. Head, palpi, antennæ, thorax, and abdomen very pale whitish-grey-ochreous; palpi slightly rosy-tinged. Legs whitish, anterior pair suffused with crimson. Forewings elongate-oblong, costa moderately arched, apex obtuse, hindmargin not oblique, faintly sinuate, rounded beneath; ochreous-whitish, becoming greyish-tinged anteriorly; costal edge pale rosy; a minute ferruginous dot in disc at  $\frac{1}{4}$ ; a rather large ferruginous dot in disc at  $\frac{2}{3}$ ; a cloudy light grey streak along posterior half of costa; a series of small crescentic ferruginous dots, proceeding

greyish-ochreous, closely sprinkled with light brown-reddish; costal edge rosy, except near apex; markings blackish; a large dot on inner margin near base, and two small dots above it; a dot in disc at  $\frac{1}{4}$ , connected with inner margin before middle by a cloudy irregular line; a dot in disc before middle, a second on fold rather beyond it, and a third in disc at  $\frac{2}{3}$ ; a very indistinct oblique irregular transverse line passing through first two of these, and another more curved through third, tending to unite in a suffusion on inner margin; a well-marked series of dots from costa beyond middle to inner margin before anal angle, unevenly bent outwards; a hindmarginal row of small dots: cilia ochreous-whitish, brownish-tinged. Hindwings whitish, with a rather narrow suffused pale fuscous hindmarginal border; cilia whitish, round apex fuscous-tinged.

Ardrossan, South Australia; one specimen. A second specimen, taken at York, West Australia, in October, is in all probability to be referred to the same species, but differs as follows: Smaller (22 mm.); forewings less sprinkled with brown-reddish, without subbasal dots except on inner margin; postmedian series of dots formed into a subdentate line; hindmarginal dots absent except one or two beneath apex; cilia with a pale rosy median line; hindwings wholly suffused with whitish-fuscous.

535. (50d) *Euch. poliarcha*, n. sp.

♀. 33 mm. Head, antennæ, and thorax whitish-ochreous. Palpi rosy-whitish. Abdomen whitish. Legs white, anterior pair and all tarsi suffused with rosy mixed with fuscous. Forewings oblong, moderately elongate, costa rather strongly arched towards base, posteriorly nearly straight, apex obtuse, hindmargin faintly sinuate, hardly oblique, rounded beneath; whitish-ochreous, faintly brownish-tinged; costal edge whitish-rosy; two faint cloudy somewhat irregular rather outwards-curved pale red-brownish lines; first from  $\frac{1}{4}$  of costa to before middle of inner margin, second from  $\frac{2}{3}$  of costa to anal angle; a similar streak

from beneath middle of costa to a dot in disc at  $\frac{2}{3}$ ; a cloudy light red-brownish narrow streak along inner margin from near base to anal angle: cilia ochreous-whitish, mixed with pale red-brownish towards apex. Hindwings whitish, apex and hindmargin ochreous-tinged; cilia whitish.

Mount Lofty, South Australia; one specimen received from Mr. E. Guest.

536. (50e.) *Euch. holoclara*, n. sp.

♂. 29-33 mm. Head and thorax light rosy-grey-ochreous, face white. Palpi rosy-whitish or light rosy. Antennæ pale grey, base rosy-tinged. Abdomen whitish, tinged with ochreous or greyish. Legs whitish, anterior pale rosy, middle tarsi suffused with rosy. Forewings oblong, rather elongate, costa moderately arched, apex obtuse, hindmargin straight, perpendicular, rounded beneath; pale greyish-ochreous, densely irrorated or wholly suffused with pale brown-reddish; costal edge rosy: a very obscure rosy dot in disc before middle and a second at  $\frac{2}{3}$ ; cilia

4. Forewings with black markings ..... *endoleuca*.  
     Forewings without black markings..... 5
5. Forewings with a submarginal series of ferruginous dots ..... *iospila*.  
     Forewings without a submarginal series of ferruginous dots ..... 6
6. Forewings with two brownish transverse lines ... *poliarcha*.  
     Forewings without two brownish transverse lines *holoclera*.

## HOPLITICA, Meyr.

537. (59a.) *Hopl. metriopis*, n. sp.

♂. 17-19 mm. Head and thorax whitish-rosy mixed with pale greyish-ochreous. Palpi whitish-rosy, second joint mixed with pale grey, becoming whitish towards base. Antennæ pale grey, obscurely ringed with darker. Abdomen and legs ochreous-whitish, anterior legs suffused with pale rosy. Forewings moderate, costa moderately arched, apex somewhat rounded, hindmargin rather obliquely rounded; whitish-rosy, somewhat mixed irregularly with pale grey; a grey dot in disc before middle, a second on fold rather obliquely beyond first, and a third rather larger in disc at  $\frac{2}{3}$ ; a series of very obscure grey dots from middle of costa very obliquely outwards, abruptly curved round in disc at  $\frac{5}{8}$  to before anal angle: cilia whitish-rosy. Hindwings very pale whitish-grey; cilia grey-whitish.

Bathurst, New South Wales; several specimens, in March, and others sent by Mrs. Stephenson. In my tabulation it falls under the same head with *H. cholodella*, and may be separated by the posterior line of forewings forming a series of obscure dots, instead of an entire striga.

538. (61a.) *Hopl. liosarca*, n.sp.

♀. 30 mm Head and thorax whitish-ochreous, brownish-tinged. Palpi whitish. Antennæ white, annulated with fuscous. Abdomen whitish. Legs white, anterior pair suffused with dull rosy



and pale ochreous. Forewings elongate-oblong, costa moderately arched, apex obtuse, hindmargin somewhat oblique, straight, rounded beneath; pale flesh-colour; a dull reddish dot in disc at  $\frac{1}{3}$ , a second on fold somewhat beyond first, both very inconspicuous, and a third more distinct in disc beyond middle; faint indications of a posterior series: cilia pale flesh-colour. Hindwings pale ochreous-grey; cilia ochreous-whitish, with a faint grey line.

Victoria; one specimen (Coll. Lucas). Falls under same head with *H. leucerythra*, from which it is distinguished by the pale grey (not whitish) hindwings, and the inconspicuous reddish (not dark fuscous) dots of forewings; it is also much larger.

539. (65a.) *Hopl. colonias*, n. sp.

♂♀. 18-21 mm. Head, palpi, and thorax greyish-fleshcolour. Antennæ in ♂ dark grey, in ♀ fleshcolour, annulated with black. Abdomen grey. Legs dark grey, obscurely ringed with whitish, posterior tibiae whitish. Forewings elongate-oblong, costa gently arched, apex obtuse, hindmargin rather obliquely rounded light

several species, whilst others of the same species are quite normal ; it cannot, therefore, in the case of this genus be used as a point of distinction. The number of additional species in this genus being large, I will give at the end of them (in the next instalment) a tabulation of the whole species of the genus, to facilitate their determination.

540. (68a.) *Eul. camelaea*, n.sp.

♂. 17 mm. Head, palpi, and thorax whitish-ochreous, second joint of palpi brownish ; shoulders pinkish-tinged. Antennæ grey, ciliations 3. (Abdomen broken.) Legs light grey ringed with whitish-ochreous, posterior pair whitish-ochreous. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin obliquely rounded ; whitish-ochreous ; a large dark reddish-fuscous white-margined blotch extending on inner margin from  $\frac{1}{4}$  to  $\frac{3}{4}$ , gradually narrowing upwards, reaching more than half across wing, upper side rounded but deeply triangularly indented before middle ; a cloudy greyish-pink band from middle of costa to apex of this blotch, posteriorly margined by a brown line suffused with ferruginous ; a curved transverse linear dark fuscous mark in disc, its lower extremity touching upper posterior angle of blotch ; a dark brown streak, suffused beneath with ferruginous, along costa from base, interrupted by median band, beyond it leaving costa and continued in a strong outward curve to anal angle, broader and more suffused anteriorly in disc, attenuated and nearly obsolete on anal angle ; the curve is posteriorly well-defined and margined by a whitish-ochreous line except towards costa ; beyond this line the apical area is wholly greyish-pink : cilia pale ochreous. Hindwings whitish-ochreous ; apical half dark grey, continued as a suffused streak along hindmargin to anal angle ; cilia grey, on inner margin whitish-ochreous.

Beechworth, Victoria ; one specimen in November (Coll. Lucas). Extremely distinct in marking from any other, but in some respects not unlike *Hoplitica colonias*.

541. (68b.) *Eul. ichneuta*, n. sp.

♂. 15 mm. Head and thorax whitish-grey, apex of patagium with a black dot. Palpi whitish, second joint with an obscure grey subapical ring. Antennae whitish, obscurely ringed with grey ciliations  $1\frac{1}{2}$ . Abdomen whitish, base of segments grey. Legs grey-whitish, anterior tibiae and all tarsi dark grey ringed with white. Forewings elongate, moderate, costa gently arched, apex tolerably obtuse, hindmargin rather obliquely rounded; whitish grey; markings black; a dot on base of costa, and another toward base in middle, followed by a small suffusion; a suffused dot on inner margin before middle; a dot in disc before middle, a second on fold rather obliquely beyond first, and a third rather larger in disc at  $\frac{2}{3}$ ; a cloudy line from  $\frac{1}{3}$  of costa through first and second discal dots to inner margin beyond middle, acutely indented outwards between the dots; some scattered black scales in disc beyond this; a series of dots from middle of costa very obliquely outwards to disc at  $\frac{5}{8}$ , thence abruptly bent to inner margin before

irrorated with dark fuscous; a dark fuscous dot in disc before middle, a second on fold hardly beyond first, and two transversely placed in disc at  $\frac{2}{3}$ ; an obscure line of fuscous scales from  $\frac{1}{3}$  of costa obliquely outwards, in disc strongly curved round to inner margin before anal angle, somewhat sinuate above curve; a row of small dark fuscous dots along hindmargin: cilia whitish-grey-ochreous, with a faint grey line. Hindwings ochreous-grey-whitish, posteriorly slightly greyer; cilia ochreous-whitish, with a very faint greyish line.

Mount Lofty, South Australia; one specimen sent by Mr. E. Guest. A ♀ specimen, taken in January on Mount Kosciusko, New South Wales, is in all probability to be referred to the same species; it is 24 mm.; palpi wholly pale whitish-ochreous; forewings less dilated, faintly reddish-tinged, irroration and dots black; two or three additional black dots near base; posterior third of costa also dotted with black; hindwings not greyer posteriorly; otherwise similar. Nearest to *E. griseola*, but the ground colour is not greyish, and the forewings are somewhat differently formed, with the hindmargin distinctly dotted.

513. (71a.) *Eul. menodes*, n. sp.

♂. 18 mm. Head grey, sides of crown above eyes, and lower part of face white. Palpi white, second joint with lower third and an apical spot blackish, base of terminal joint blackish. Antennæ grey, slenderly annulated with black, ciliations 2. Thorax grey. Abdomen ochreous-grey-whitish. Legs dark grey, ringed with ochreous-whitish, posterior pair suffusedly whitish. Forewings elongate, moderate, posteriorly dilated, costa gently arched, apex rounded, hindmargin oblique, slightly rounded; rather dark grey, somewhat sprinkled with whitish-grey, with a few black scales posteriorly; some black scales at base; three round white discal dots, margined anteriorly by crescentic black dots, first in disc at  $\frac{1}{3}$ , second on fold directly beneath first, third larger, in disc beyond middle; a small dark fuscous suffusion beneath third dot; a cloudy line of blackish scales from  $\frac{1}{3}$  of costa

to inner margin before anal angle, strongly curved outwards beneath costa indented outwards, suffusedly margined with white scales posteriorly: cilia grey. Hindwings grey; cilia whitish grey.

Geraldton, West Australia; one specimen in November. Probably nearest to *E. crennodes*, but specially characterised by the peculiar white and black discal dots.

544. (72a.) *Eul. eriphila*, n. sp.

♂. 18 mm. Head and thorax light pinkish-grey. Palpi pal pink, second joint externally suffused with grey. Antennae grey. Abdomen grey-whitish. Legs dark grey, ringed with whitish posterior pair whitish. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; pale flesh colour, suffused with light greyish except on costal edge, and thinly irrorated with blackish; a black dot in disc at  $\frac{1}{3}$ , a second on fork hardly beyond first, and a third in disc beyond middle. Hindwings

hindmargin obliquely rounded; pale whitish-fuscous, with some scattered dark fuscous scales; a dark fuscous dot in disc before middle, a second on fold directly beneath first, and a third in disc at  $\frac{2}{3}$ ; a series of dark fuscous dots from middle of costa close beneath costa almost to apex, thence very near hindmargin to anal angle: cilia fuscous-whitish, round apex sprinkled with fuscous. Hindwings very pale whitish-grey; cilia whitish.

Sydney, New South Wales; two specimens in October. Nearest to *E. melesella*, but much smaller, forewings not strongly dilated, groundcolour fuscous-tinged, not ochreous, veins not lined with darker. A very dull-looking and inconspicuous species, likely to be neglected.

546. (78a.) *Eul. autophylla*, n. sp.

♂♀. 22-25 mm. Head, palpi, antennæ, thorax, abdomen, and legs white, thorax faintly tinged with ochreous-grey; antennal ciliations of ♂  $1\frac{1}{2}$ . Forewings elongate, moderate, costa gently arched, apex round-pointed, hindmargin obliquely rounded; ochreous-white, irrorated with very pale whitish-grey; cilia white. Hindwings light grey, becoming paler or grey-whitish towards base; cilia white.

Carnarvon, West Australia; three specimens in October, beaten from a shrub with very pallid flocculent leaves, which they closely resembled in colour.

547. (78b.) *Eul. homoteles*, n. sp.

♂♀. 17-19 mm. Head ochreous-white, centre of crown pale brownish-ochreous. Palpi brownish-ochreous, terminal joint and apex of second white. Antennæ white, obscurely annulated with pale ochreous, ciliations of ♂ 1. Thorax light brownish-ochreous. Abdomen greyish. Legs fuscous, posterior pair whitish. Forewings very elongate, rather narrow, costa gently arched, apex rounded, hindmargin extremely obliquely rounded; pale brownish-ochreous, towards hindmargin somewhat irrorated with fuscous;

a very faint fuscous dot in disc at  $\frac{2}{3}$  : cilia pale brownish-ochreous. Hindwings grey, fuscous-tinged ; cilia whitish-fuscous.

Duaringa, Queensland ; three specimens received from Mr. G. Barnard.

548. (78c.) *Eul. heliocomia*, n. sp.

♀. 13-18 mm. Head rather dark purple-fuscous, side-tufts ochreous-orange. Palpi, antennæ, thorax, and legs rather dark purplish-fuscous, posterior legs whitish-ochreous. Abdomen fuscous, somewhat mixed with orange-ochreous. Forewings elongate, costa gently arched, apex tolerably obtuse, hindmargin obliquely rounded ; rather dark fuscous, faintly purplish-tinged : cilia fuscous. Hindwings rather dark fuscous ; cilia fuscous.

Duaringa, Queensland ; three specimens received from Mr. G. Barnard.

549. (79a.) *Eul. malacoptera*, n. sp.

♂♀. 14-18 mm. Head orange-yellow. Palpi yellow, lower half of second joint dark fuscous. Antennæ grey, ciliations in ♂ 2. Thorax dark grey, posterior half orange-yellow. Abdomen grey.

ciliations in ♂  $2\frac{1}{2}$ . Thorax blackish, posterior half orange-yellow. Abdomen dark grey, anal tuft yellowish. Forewings elongate, costa hardly arched, apex tolerably rounded, hindmargin rounded, rather strongly oblique; orange-yellow; a narrow rather irregular-edged nearly erect blackish fascia from anal angle, not reaching costa, apex somewhat bent outwards; a slender blackish streak along hindmargin, dilated into a small spot towards apex: cilia dark grey. Hindwings dark grey; cilia grey, on costa light yellowish.

Geraldton, West Australia; common in November.

551. (79c.) *Eul. cephalanthes*, n. sp.

♂♀. 15-18 mm. Head and thorax bright orange. Palpi yellow-whitish, second joint with a broad dark grey subapical band. Antennæ grey, base yellowish, ciliations in ♂  $1\frac{1}{2}$ . Abdomen whitish-grey, two basal segments dark fuscous. Legs dark fuscous, posterior pair grey-whitish. Forewings elongate, costa gently arched, apex round-pointed, hindmargin almost straight, very oblique; whitish-yellowish; base narrowly suffused with orange: cilia whitish-yellowish. Hindwings grey; cilia grey-whitish.

Albany, West Australia; in December, common amongst rough herbage in the plains. The colouring of this species is singular.

552. (79d.) *Eul. eocrossa*, n. sp.

♂. 18-20 mm. Head and thorax whitish-ochreous. Palpi whitish, second joint grey except apex. Antennæ ochreous-whitish, ciliations 1. Abdomen whitish-grey-ochreous. Legs pale whitish-ochreous, anterior and middle pair infuscated. Forewings elongate, costa gently arched, apex round-pointed, hindmargin almost straight, rather strongly oblique; whitish-ochreous, sometimes slightly yellowish-tinged, towards hindmargin and apex more or less widely suffused with pale rosy: cilia pale rosy. Hindwings fuscous-grey; cilia whitish-grey-ochreous, with a cloudy grey line.

Bathurst, New South Wales; three specimens sent by Mrs. Stephenson. Nearest to *E. puellaris*, but brighter-coloured, without grey dots or scales.



553. (81a.) *Eul. amphidyas*, n. sp.

♂. 17-18 m.m. Head and thorax pale whitish-yellowish. Palpi, antennæ, abdomen, and legs whitish; antennal ciliations 2; anterior legs greyish. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; pale whitish-yellow; a small round grey spot in disc slightly before middle, and another at  $\frac{3}{4}$ : cilia ochreous-whitish. Hindwings pale grey; cilia ochreous-whitish, base more ochreous.

Geraldton and York, West Australia; two specimens in November.

554. (81b.) *Eul. ophthalmias*, n. sp.

♀. 17 mm. Head and antennæ purple-blackish, face ochreous-yellowish. Palpi whitish-ochreous, base and apex of second joint suffused with dark fuscous, terminal joint dark fuscous except posterior edge. Thorax purple-blackish, posterior half light ochreous-yellowish. Abdomen light grey. Legs dark purple-fuscous, ringed with whitish-ochreous, posterior tibiae pale yellowish above. Forewings elongate, costa gently arched, apex

Antennæ grey, ciliations 1. Thorax pale reddish, irrorated with blackish-grey except apex of patagia. Abdomen ochreous-grey-whitish. Legs dark fuscous, apex of joints whitish, posterior tibiae grey-whitish. Forewings elongate, costa gently arched, apex rounded, hindmargin very obliquely rounded; pale reddish, irrorated with grey; costal edge suffused with grey; a suffused irregular dark grey central streak from base to apex, lower edge marked with a black streak from base to  $\frac{1}{3}$ , upper edge marked with a black streak from  $\frac{1}{3}$  to  $\frac{3}{4}$ , whence it forms a fork nearly reaching costa and hindmargin; a black dot above upper margin of streak before middle, and another resting on upper margin beyond middle, beneath which is an indentation of groundcolour in the lower edge; beneath median streak from base to anal angle is a broad streak of groundcolour clear from irroration; a cloudy dark grey streak round apex and upper part of hindmargin: cilia pale whitish-reddish irrorated with grey. Hindwings light grey; cilia grey-whitish, with a faint grey line.

Cooma (3000 feet), New South Wales; Hobart, Tasmania; in December and January, two specimens.

556. (81d.) *Eul. graphica*, n.sp.

♂♀. 16-19 mm. Head and thorax grey mixed with whitish. Palpi whitish, second joint light grey except apex. Antennæ grey, ciliations 1. Abdomen and legs grey, posterior legs grey-whitish. Forewings elongate, posteriorly slightly dilated, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; light grey, suffusedly irrorated with white except towards inner margin, and with some thinly scattered black scales; markings fuscous irrorated with black; a dot near base beneath costa; a dot in disc at  $\frac{1}{3}$ , and a minute dot on fold beneath it; a straight linear streak from  $\frac{3}{4}$  of disc to near anal angle, not reaching it; a cloudy dot on costa beyond middle; a line from  $\frac{1}{4}$  of costa to anal angle, angulated outwards in middle, upper half forming a sharp angle inwards, lower half straight; an interrupted

hindmarginal line: cilia pale grey, with a blackish somewhat interrupted line at  $\frac{1}{3}$ , basal third mixed with whitish. Hindwings light grey; cilia whitish-grey, with a faint grey line.

Warragul, Victoria; Port Lincoln, South Australia; in November, two specimens.

557. (81e.) *Eul. delotis*, n.sp.

♂♀. 16-19 mm. Head and thorax pale grey, face whitish, thorax with a black dot on posterior extremity. Palpi whitish, second joint with a dark grey subapical ring. Antennae grey-whitish, ciliations in ♂  $1\frac{1}{2}$ . Abdomen whitish-ochreous. Anterior legs grey, apex of joints whitish; middle legs whitish; posterior legs whitish-ochreous. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; pale grey, faintly ochreous-tinged; a small black spot on base of inner margin; six black dots, first in disc at  $\frac{1}{3}$ , second on fold obliquely beyond first, third larger, in disc at  $\frac{2}{3}$ , fourth ill-defined, above and before third, fifth ill-defined on inner margin at  $\frac{1}{2}$ , sixth lower

whitish-ochreous. Legs dark fuscous, ringed with ochreous-yellowish, posterior tibiae yellow-whitish. Forewings elongate, narrow, costa slightly arched, apex rounded, hindmargin extremely obliquely rounded; purple-blackish; markings light ochreous-yellow; a small basal spot; a cloudy transverse spot from costa near base; a moderate rather irregular fascia from middle of costa to inner margin before anal angle; a rather small somewhat inwardly oblique spot on costa at  $\frac{3}{4}$ ; a small apical spot, sending a streak along upper half of hindmargin: cilia dark grey. Hindwings grey, paler towards base; cilia light grey, towards anal angle more grey-whitish.

Murrurundi, Newcastle, and Sydney, New South Wales; Melbourne, Victoria; Mount Lofty, South Australia; in September and October, not uncommon. Mr. Guest informs me that on Mount Lofty it is very common. The larva feeds in dead wood.

559. (81g.) *Eul. gonosema*, n. sp.

♀. 19 mm. Head ochreous-yellowish. Palpi fuscous, internally pale yellowish (terminal joint broken). Antennæ fuscous. Thorax dark fuscous, posterior half pale ochreous-yellowish. Abdomen fuscous, ochreous-tinged except towards the base, anal tuft pale ochreous. Legs rather dark fuscous, posterior pair pale yellowish. Forewings elongate, rather narrow, costa gently arched, apex round-pointed, hindmargin slightly rounded, very oblique; light ochreous-yellowish; markings ochreous-fuscous, faintly purplish-tinged; a narrow basal fascia, connected with a line along basal third of costa; a small spot on fold before middle; a moderate fascia, acutely angulated inwards, from about  $\frac{3}{4}$  of costa to anal angle, the angle sending a projection inwards to middle of disc which almost reaches spot on fold; a narrow streak along hindmargin, dilated into a small spot towards apex: cilia light ochreous-yellowish. Hindwings fuscous, slightly bronzy-tinged; cilia whitish-ochreous-yellowish.

rowish. Antennae whitish-yellow  
 fuscous scales. Antennae d  
 yellowish, in ♂ serrate, cilia  
 with a small posterior wh  
 Legs dark grey, apex of tars  
 yellow-whitish. Forewings  
 arched, apex round-pointe  
 rounded; light ochreous-yel  
 fascia, rather produced along  
 towards inner margin at  $\frac{1}{2}$   
 middle; apical area, beyo  
 from middle of costa to in  
 dark fuscous, slightly mixe  
 with a very obscure small  
 some blackish scales on divic  
 Hindwings and cilia grey.

Launceston and Delors  
 November.

561. (81k.) 1

♂. 11-12 mm. Head whi  
 second joint fuscous except  
 tions  $2\frac{1}{2}$ . Thorax, abdomen  
 joints whitish, posterior leg  
 costa slightly arched, apex to  
 " " " " "

fascia, rather produced along inner margin ; a moderate irregular fascia from costa before middle to middle of inner margin, dilated on margins ; an erect fascia-like spot from anal angle, reaching half across wing, and a cloudy spot on costa at apex, but sometimes these are confluent, covering apical third of wing : cilia whitish-fuscous, with a cloudy dark fuscous line near base. Hindwings and cilia light ferruginous-brown.

Quorn, South Australia ; in October, four specimens.

562 (83a.) *Eul. schalidota*, n. sp.

♂. 13 mm. Head, snow-white. Palpi white, second joint ochreous-fuscous except towards apex. Antennæ whitish, ciliations  $\frac{3}{4}$ . Thorax yellow-brown, posterior half white. Abdomen ochreous-whitish. Legs dark fuscous, posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin obliquely rounded ; snow-white ; markings bright yellowish-brown ; a small spot on base of costa ; a moderate straight fascia from costa before middle to inner margin before middle, rather narrowed on costa, posterior edge with an abrupt projection on inner margin ; a moderate rather inwards-curved fascia from  $\frac{3}{4}$  of costa to anal angle, and a straight submarginal fascia, broadly confluent together on lower half ; a hindmarginal row of obscure dots : cilia pale yellow-brownish, base and tips suffused with white except at anal angle, where there is a dark fuscous irroration. Hindwings light grey ; cilia ochreous-grey-whitish.

Duaringa, Queensland ; one specimen received from Mr. G. Barnard. Allied to *E. epicausta*, but with an additional submarginal fascia.

563. (83 b.) *Eul. tropica*, n. sp.

♂♀. 15-19 mm. Head white, face ochreous-tinged. Palpi white, second joint ochreous-fuscous except apex. Antennæ whitish, ciliations of ♂  $\frac{3}{4}$ . Thorax rather dark ochreous-fuscous,

posterior half white. Abdomen ochreous-grey, anal tuft ochreous-yellowish. Legs dark grey, posterior pair whitish-ochreous. Forewings elongate, costa gently arched, apex tolerably rounded, hindmargin obliquely rounded; snow-white; four bright golden-brown moderate rather irregular-edged fasciae; first basal not reaching costa; second from  $\frac{1}{2}$  of costa to before middle of inner margin, somewhat bent or produced outwards on costa, on inner margin posteriorly with an abrupt projection barely touching third fascia; third from  $\frac{2}{3}$  of costa to anal angle moderately curved inwards; fourth narrower, along hindmargin from apex to anal angle, where it meets third: cilia pale-ochreous, on anal angle greyish-tinged, tips sometimes whitish. Hindwings grey; cilia pale-grey, ochreous-tinged.

Duaringa, Queensland; from January to March; sent commonly by Mr. G. Barnard. Easily recognised by the hindmarginal fascia.

564. (84a.) *Eul. phaeostephes*, n. sp.

565. (86a.) *Eul. elaeota*, n. sp.

♂♀. 18-21 mm. Head ochreous-yellow. Palpi dark grey, upper side ochreous-white. Antennæ grey, ciliations in ♂ 1. Thorax pale yellow-ochreous, anteriorly suffused with dark grey. Abdomen ferruginous, segmental margins pale yellowish, basal segment dark grey. Legs dark grey, posterior tibiae pale yellowish. Forewings very elongate, rather narrow, costa gently arched, apex acute, hindmargin faintly sinuate, very oblique; ochreous-white, dorsal half wholly suffused with light yellow-ochreous; a rather narrow dark grey streak along costa from near base to  $\frac{3}{4}$ , extremities pointed; a black dot beneath costa near base; a black dot in disc at  $\frac{1}{3}$ , a second on fold directly beneath first, a third somewhat beyond and above middle, and three, somewhat larger and more or less confluent, placed in a short curved inwardly oblique line in disc at  $\frac{2}{3}$ ; sometimes a grey suffusion along upper margin of yellowish dorsal suffusion from base to  $\frac{2}{3}$ ; a more or less thick dark grey streak from  $\frac{2}{3}$  of disc to apex, tolerably dilated towards costa, lower extremity sometimes rather projecting downwards; sometimes an obscure ill-defined dark grey submarginal line, attenuated or obsolete beneath: cilia whitish-ochreous, above apex with a dark grey space, on anal angle greyish-tinged. Hind wings rather dark grey; cilia pale whitish-ochreous, more or less greyish-tinged.

Perth, West Australia; in November, on the western slope of the dividing range, locally abundant. This and the four following species form a connected group, all western; so far as my experience goes, the first three are all unusually local, confined to very small patches of ground apparently not differing from the surrounding bush.

566. (86b.) *Eul. catoplosta*, n. sp.

♂♀. 17-19 mm. Head ochreous-white. Palpi dark grey, upper side white. Antennæ grey, ciliations in ♂ 1. Thorax white, shoulders with a cloudy dark grey spot, anterior margin sometimes



suffused with grey. Abdomen ferruginous, somewhat mixed with grey, segmental margins whitish-ochreous, sometimes greyish-tinged, basal segment dark grey. Legs dark grey, posterior tibiae whitish-ochreous. Forewings very elongate, rather narrow, costa gently arched, apex acute, hindmargin faintly sinuate, very oblique; white, dorsal half more or less irrorated or suffused with grey, an ill-defined grey streak along costa from near base to  $\frac{3}{4}$ , extremities attenuated; a black dot beneath costa near base: a black dot in disc at  $\frac{1}{2}$ , a second on fold nearly beneath first, a third slightly beyond and above middle, and three more or less confluent (two lower sometimes obsolete) placed in a short curved inwardly oblique line in disc at  $\frac{3}{4}$ ; a cloudy grey streak from costa before apex to disc at  $\frac{1}{4}$ , more or less confused with some grey scales on hindmargin: cilia pale grey. Hindwings rather dark grey; cilia pale grey.

Perth, West Australia; in November, locally common in a small piece of sandy scrub.

below middle preceded and followed by some whitish scales: cilia dark grey, in ♀ lighter and more or less suffused with whitish between apex and anal angle. Hindwings rather dark grey; cilia grey, becoming suffused with whitish-ochreous towards anal angle.

Perth, West Australia; in October, confined to a space about fifty yards across on the hill near the town, but there very plentiful; I was unable to detect any plants there which were not equally common in the surrounding bush.

568. (86d.) *Eul. xanthocrossa*, n. sp.

♂♀. 16-20 mm. Head whitish-ochreous or ochreous-whitish. Palpi dark grey, upper side white. Antennæ dark grey, ciliations in ♂ 1. Thorax rather dark grey. Abdomen ferruginous, segmental margins light ochreous-yellowish, basal segment grey. Legs dark grey, posterior pair light ochreous-yellowish. Forewings very elongate, rather narrow, costa gently arched, apex acute, hindmargin faintly sinuate, extremely oblique; fuscous-grey, finely sprinkled with grey-whitish, in ♀ disc sometimes partly suffused with whitish; five very obscure dots formed by a dark fuscous irroration, first in disc at  $\frac{1}{3}$ , second on fold directly beneath first, third slightly beyond and above middle, fourth transverse, in disc at  $\frac{2}{3}$ , fifth obliquely below and before fourth: cilia grey. Hindwings rather dark grey; cilia light ochreous-yellow.

Geraldton, West Australia; six specimens in October.

569. (86e.) *Eul. glaphyrotia*, n. sp.

♂♀. 17-18 mm. Head whitish-ochreous. Palpi grey, upper side whitish. Antennæ grey, ciliations in ♂ 1. Thorax ochreous-grey. Abdomen grey, anal tuft whitish-ochreous. Legs dark grey, posterior pair ochreous-whitish. Forewings very elongate, rather narrow, costa gently arched, apex acute, hindmargin sinuate, extremely oblique; ochreous-grey: cilia whitish-ochreous-grey. Hindwings grey; cilia whitish-grey-ochreous.

Albany, West Australia; from September to December, several specimens.

570. (96a.) *Eul. archepepla*, n.sp.

♂. 20-21 mm. Head, antennæ, and thorax light grey, antennal ciliations  $1\frac{1}{2}$ . Palpi grey, upper side white. Abdomen pale greyish-ochreous. Legs dark grey, posterior pair ochreous-whitish. Forewings elongate, costa moderately arched, apex rounded, hind margin very obliquely rounded; grey, sprinkled with grey-whitish, a narrow cloudy blackish rather outwards-curved fascia very near base, not reaching inner margin; six black dots, first in disc at  $\frac{1}{2}$ , second large, on fold directly beneath first, third in disc above middle, fourth in disc at  $\frac{2}{3}$ , fifth close beneath fourth, sixth obliquely close below and before fifth; an obscure line of cloudy blackish nearly connected dots from  $\frac{1}{2}$  of costa to anal angle, curved outwards, beneath costa acutely indented inwards; cilia light grey. Hindwings grey; cilia pale grey.

Sydney, New South Wales; also from Victoria; three specimens in November. This species has much general resemblance to *Neobryonia* but is much larger and has a more pronounced

blackish-fuscons dots from  $\frac{1}{3}$  of costa to anal angle, angulated outwards in middle, somewhat sinuate inwards beneath costa: cilia light grey mixed with whitish, with an ill-defined dark grey line near base. Hindwings light grey; cilia ochreous-grey-whitish.

Albany, West Australia; very common in December, on fences beneath *Eucalyptus*. Nearest to *E. siccella*.

572. (104a.) *Eul. diagramma*, n.sp.

♀. 19 mm. Head and thorax blackish-grey densely irrorated with white, face whitish. Palpi blackish, second joint with ill-defined white apical and median bands, terminal joint mixed with white towards base. Antennæ whitish, obscurely annulated with dark fuscous. Abdomen light greyish-ochreous. Anterior legs dark grey ringed with whitish, middle and posterior pairs whitish-ochreous. Forewings very elongate, rather narrow, costa gently arched, apex round-pointed, hindmargin very obliquely rounded: grey, densely mixed with white, and somewhat irrorated with black; markings blackish, rather ill-defined; a longitudinal streak beneath costa from base to near middle; a streak beneath middle from base to  $\frac{2}{3}$  interrupted beyond  $\frac{1}{3}$ ; a median streak from  $\frac{1}{3}$  to  $\frac{3}{4}$ ; a series of cloudy subconfluent marks from  $\frac{2}{3}$  of costa very obliquely outwards to beneath apex, thence bent and continued near hindmargin to  $\frac{3}{4}$  of inner margin: cilia pale grey, basal half suffused with white, with an ill-defined irregular cloudy blackish line. Hindwings fuscous-grey; cilia whitish-ochreous.

Albany, West Australia; one specimen in December.

573. (104b.) *Eul. athletis*, n.sp.

♂. 21-23 mm. Head and thorax whitish mixed with dark fuscous, thorax ochreous-tinged. Palpi black, apex of second joint, and terminal joint except anterior edge white. Antennæ grey, ciliations 1. Abdomen ochreous-grey-whitish. Legs dark fuscous, ringed with white, posterior pair ochreous-whitish. Forewings very elongate, rather narrow, posteriorly slightly

578. (108e.) *Eul. callisceptra*, n. sp.

♂♀. 20-25 mm. Head and thorax ochreous-whitish. Palpi fuscous, upper side white. Antennæ grey or whitish, ciliations in ♂ 1. Abdomen pale whitish-ochreous. Legs rather dark fuscous, posterior pair pale whitish-ochreous. Forewings very elongate, rather narrow, costa gently arched, apex round-pointed, hind-margin very obliquely rounded; snow-white; costal edge near base very slenderly dark fuscous; a moderate well-defined rather dark ochreous-brown subcostal streak from base to apex; dorsal half of wing sometimes partially mixed with brownish-ochreous, tending to form a suffusion along inner and hind margins, and a small spot above anal angle, but these are often wholly absent: cilia ochreous-whitish, with a brownish apical bar, sometimes nearly obsolete. Hindwings with veins 3 and 4 sometimes separate; grey or whitish-grey; cilia whitish-ochreous.

Perth, York, and Geraldton, West Australia, common in November. The variation of this species tends to produce local

580. (108g.) *Eul. thrincotis*, n. sp.

♂♀. 20-24 mm. Head pale ochreous, sides of crown whitish. Palpi ochreous-fuscous, upper side white. Antennæ whitish, ciliations in ♂ 1. Thorax ochreous-grey or brownish-ochreous. Abdomen whitish-ochreous, sometimes greyish-tinged. Legs rather dark fuscous, posterior pair whitish-ochreous. Forewings very elongate, rather narrow, costa gently arched, apex round-pointed, hindmargin extremely obliquely rounded; ochreous-brown or brownish-grey; a rather narrow well-defined snow-white costal streak from base almost to apex: cilia pale ochreous-brown or grey. Hindwings with veins 3 and 4 sometimes separate; grey; cilia whitish-ochreous, in ♀ more or less greyish-tinged.

Geraldton, West Australia; four specimens in November.

581. (108h.) *Eul. homocesta*, n. sp.

♂♀. 22-27 mm. Head grey-whitish. Palpi whitish, mixed with pale grey. Antennæ greyish, ciliations in ♂ 2. Thorax greyish-ochreous. Abdomen pale whitish-ochreous, two basal segments rather dark fuscous. Legs dark fuscous, posterior pair grey-whitish. Forewings very elongate, rather narrow, costa moderately arched, apex pointed, hindmargin faintly sinuate, extremely oblique; greyish-ochreous; a white costal streak from base to  $\frac{2}{3}$ , posteriorly attenuated: cilia pale greyish-ochreous. Hindwings grey; cilia pale greyish-ochreous.

Guildford, West Australia; locally abundant in October.

582. (108k.) *Eul. homochalca*, n. sp.

♂♀. 15-19 mm. Head pale whitish-ochreous, crown bronzy-tinged. Palpi grey mixed with whitish. Antennæ grey, ciliations in ♂ 1. Thorax bronzy-ochreous. Abdomen grey. Legs rather dark fuscous, posterior pair ochreous-grey-whitish. Forewings very elongate, narrow, costa gently arched, apex round-pointed,

hindmargin extremely obliquely rounded; bronzy-ochreous; costal edge obscurely whitish: cilia pale bronzy-ochreous. Hindwings with veins 3 and 4 sometimes separate; grey; cilia light grey.

York, West Australia; four specimens in November.

583. (1081.) *Eul. cyenoptera*, n. sp.

♂♀. 13-16 mm. Head and thorax white. Palpi white, second joint irrorated with ochreous-fuscous except apex. Antennae white, ciliations in ♂ 1. Abdomen ochreous-whitish. Legs whitish-ochreous, anterior pair infuscated. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded, white: cilia white. Hindwings pale grey or whitish-grey; cilia pale whitish-ochreous.

Newcastle, Sydney, Bathurst, and Kiama, New South Wales, from October to April, rather common.

## THE INTER-COXAL LOBE OF CERTAIN CRAYFISHES.

By W. J. MACKAY, B.Sc.

I have been enabled to make the observations embodied in this note, at the Biological Laboratory of the Sydney University, through the kindness of Dr. Haswell, whom I have to thank for having directed my attention to the subject, and for having supplied me with the requisite materials.

In a figure of the branchial region of *Astacopsis Franklinii*, in Huxley's paper 'On the Classification of the Crayfishes,'\* there are represented certain appendages connected with the branchiæ, though there is no reference to them in the text, nor has attention, as far as I can ascertain, been specially directed to them. These appendages in the case of *Astacopsis serratus*, and the same holds good of *A. bicarinatus*, are visible before the removal of the branchiostegites, provided the animal be turned sternal side uppermost and the legs separated. They may then be seen as triangular-shaped bodies lying under the edges of the branchiostegites, and attached to the posterior faces of certain thoracic limbs.

On removing the branchiostegites the appendages are partly hidden from view by the bases of the podobranchiæ; but on these being turned aside they are seen to be behind and below the anterior arthrobranchiæ, and perpendicular to and below the posterior arthrobranchiæ; each of them being attached by a small neck to the membrane which, arising from the posterior aspect of the coxopodite, reaches to the epimeron above, and behind is attached to the arthrophragm of the particular limb.

Examined more closely, the upper portion of the anterior face of one of these bodies, which may be called the *inter-coxal lobes*, is alone united to the arthrodial membrane; while the lower surface of the anterior face is applied to the base of the coxopodite, which is smooth and convex.

\*P.Z.S., 1878, p. 765.



The surface of the appendage that is first exposed on removing the base of the podobranchia is somewhat of an oblong in shape. The upper portion is triangular, convex, light in colour, and free from setæ: the lower portion is likewise convex, but dark in colour, and covered with setæ which project prominently from its surface. Both the upper and lower portions of this surface are chitinous.

The anterior face mentioned above as being applied to the base of the coxopodite, is triangular in outline, concave, dark in colour and covered with setæ. The lower portion of this face is chitinous, the upper membranous, being in fact a continuation of the arthroclial membrane.

The posterior face of the body is concave, lower portion chitinous and covered with setæ; the upper free from setæ and membranous. Thus from the concave shape of the anterior face the body is able to fit well on the convex base of the coxopodite while its posterior concave surface likewise fits the convex anterior border of the coxopodite of the following thoracic limb when the

led me to enquire whether the structures above described might not represent this part of the limb in an abortive form and with its position altered; but exopodites of the ordinary form are, as I have ascertained, entirely wanting also in *Astacopsis* in which the inter-coxal lobes are highly developed; the latter cannot therefore be transformations of the ordinary exopodites; nor can they be exopodites which are abortive from the outset, since in *Homarus*, in which they are highly developed, the larva when hatched has exopodites of the ordinary form attached at the basi-ischiopodite joint.

NOTES ON THE NIDIFICATION OF *SPHECOTHERES*  
*MAXILLARIS*, (LATH.), AND OF *CAMPEPHAGA*  
*LEUCOMELÆNA*, (V. & H.), WITH DESCRIPTIONS  
OF THEIR EGGS.

By R. D. FITZGERALD, JUNR.

(Communicated by Dr. E. P. Ramsay, F.R.S.E.)

*SPHECOTHERES* MAXILLARIS, Lath.

*S. australis*, Gould, Bds. Aust. Handb., p. 467, sp. 286.

This remarkable species, which appears to be somewhat gregarious in its habits, I found breeding during the latter part of October and the beginning of November in the bushes of the

## CAMPEPHAGA LEUCOMELÆNA, V. and H.

*C. leucomela*, V. and Horsf. ; Gould, Bds. Aust. Handbk., p. 203, sp. 111.

A nest of this species taken at Ballina near the mouth of the Richmond River on November 4th, is composed of the wiry and pliant stems of herbs and grasses entwined and matted together with cobweb, and a few pieces of lichen felted together making the outside resemble the branch, in a fork of which it is placed ; the nest is about the size of that of *Lalage tricolor*, being comparatively small for the size of the bird ; the one at present under consideration was placed between a fork in a small branch of a Tea-tree (*Melaleuca* sp.); it is a small and shallow structure, being only 2·1 inches outside diameter by 1·35 inches inside, and without any special lining. It contained but one egg, which I believe is all that is laid for a sitting, for on shooting and dissecting the female no other egg was found in any degree of maturity.

The egg is of a bright apple-green color, with a well-defined zone of reddish-brown spots near the thicker end ; the rest of the surface is thickly sprinkled with dots, freckles, and small spots of the same, or of a slightly brighter tint, which are less close together on the thin end ; it is rather elongated in form, measuring in length 0·98 inch, its shorter diameter being 0·68.

NOTES ON SOME SCARITIDÆ FROM QUEENSLAND,  
WITH DESCRIPTIONS OF TWO NEW SPECIES.

BY WILLIAM MACLEAY, F.L.S., &c.

Mr. George Barnard, of Coomoooolaroo, Upper Dawson River, brought me a few weeks ago a collection, or rather, I should say, a selection from his collection, of a number of Australian Scaritidæ, which he was desirous of getting named. I recognised among them the following species:—*Monocentrum grandiceps*, Chaud.; *Monocentrum longiceps*, Chaud.; *Eutoma episcopale*, Casteln.; *Eutoma magnificum*, Maccl.; *Eutoma bipunctatum*, Maccl.; *Eutoma punctulatum*, Maccl.; *Conopterum Barnardi*, Maccl.; *Carenoscapus*

transversely striolate; the median line is strongly marked from near the apex to the transverse line forming the basal lobe; there are three setigerous punctures in each lateral margin. The elytra are oval, of an opaque slightly violet tinge, and very obsolete striate-punctate, the shoulders being angular and reflexed; the margin is a very brilliant green, and there are two impressed punctures on each elytron placed as in *C. interruptum*. The anterior tibiae are armed with two teeth externally, and they seem in this species to be of more than normal size. The under-surface is nitid. Length 9 lines.

*Hab.*—Dawson River.

PHILOSCAPHUS BARNARDI, n.sp.

Like *P. carinatus* in form and sculpture. Black and opaque. Head as in *P. carinatus*. Thorax of the same form as in *P. carinatus*, but a little less transverse and flatter, with the margins of the sides and the basal lobe of a fiery red gold-colour. The elytra are of a narrow oval form, narrower than the thorax, and quite smooth; the lateral margin is broad and is defined on each elytron by a distinct ridge extending from the humeral angle to near the apex and taking the oval form of the elytra; between these ridges the elytra are perfectly flat, and the space between the ridges and the margin is nearly vertical, contains a row of about 16 large punctures, and has the same fiery red-gold edging as the thorax but larger. The humeral angles form a very conspicuous boss; there is a patch of bright fiery red inside the sublateral ridge near the humeral angles, which encloses three punctures, and on this sublateral ridge near the apex there is one golden puncture visible. Beneath cyaneous, very nitid, anterior tibiae tridentate. Long.  $7\frac{1}{2}$  lines.

*Hab.*—Dawson River.

This very beautiful and apparently very rare species I have named after its discoverer, Mr. Barnard.

NOTE ON A LEUCITE-BASALT FROM CENTRAL NEW  
SOUTH WALES.

BY REV. J. MILNE CURRAN, F.G.S.

The object of this note is to record the existence and discovery of a Leucite-basalt—a rock hitherto unknown in Australia, and, by giving publicity to the fact, to elicit some information as to its existence in other parts of the colonies.

Alexander von Humbolt is responsible for the opinion which until lately was generally received, that leucite was a mineral occurring only in Europe. Up to the present it has not been found very widely distributed. It is found in the recent Vesuvian

shared my views on the matter with Mr. W. Anderson, and decided to examine the locality, when we were rewarded by discovering a patch of some five square miles of a leucite-basalt similar in every respect to the rock I found at Byerock. At the latter place the basalt rests in part on a silurian slate and an intrusive granite, while near Cobar the underlying rocks are silurian slates and conglomerates, and a silicified tertiary drift.

The texture of the leucite-rock varies somewhat in different localities. Macroscopically there is nothing in the external appearance of the rock to indicate its richness in leucite. It occurs as a dark fine-grained rock with patches of a reddish-brown mineral—probably mica. The dark, almost black colour is due to the great abundance of magnetite the rock contains. When a thin slice is examined the leucite is found to be the dominant ingredient in the mass. It is distributed in closely packed, rounded or roughly octagonal grains between which no vitreous matter can be detected. The leucite is more abundant than in any of the typical leucite-basalts figured by Fouque and Michel Levy\*, or Rosenbusch†, and almost as plentiful as in the American rocks already referred to‡. In a few of the slices I have detected the well-known and characteristic radial and concentric interpositions so common in the Vesuvian leucites.

As far as is known at present leucite rocks occur only among tertiary and recent volcanic productions. The Australian example proves no exception, for both Byerock and El Capitan basalts belong certainly to tertiary, and to my mind latter tertiary times.

For detailed microscopic examination I have sent some slices to our eminent Australian petrologist, Mr. A. W. Howitt, of Sale, Gippsland.

---

\* *Mineralogie Micrographique*. Planches 48, 49, 50, and 51.

† *Micro. Phys. wichtigen Mineralien*, Taf. 14. (Zweite Auflage).

‡ *Micro. Petrography*, by F. Zirkel—(Geol. of Fortieth Parallel).



ON A NEW BUTTERFLY OF THE FAMILY SATYRIDÆ.

By A. SIDNEY OLLIFF, F.E.S.,

MEM. DE LA SOC. ENT. DE FRANCE.

The species for which I now propose the name *Xenica Ella* was captured by Mr. Peel at Warra, in the Liverpool Plains district during the early part of last summer. It exhibits unmistakable affinity to *Xenica Kershawi*,\* a Gippsland species which is allied to *X. orichora*† and *X. lathoniella*. Besides this new form I have received from the Liverpool Plains three Satyridæ not previously recorded from so far north, namely, *Heteronympha phil-ropæ*, Bois, *H. cordace*, Hubn., and *Xenica lathoniella*, Westw.‡

the angle, a broad fascia extending obliquely from costal margin to ocellus, avoiding the cell; a narrow submarginal streak from base to just before anal angle, a shorter one from below cell; a spot near base, another within the cell, and a series of five irregular spots near the hind-margin. Underside marked much as above. Forewing lighter, the markings less distinct; the disc orange-fulvous surrounding a fuscous marking, the spot below the cell and the three near the posterior angle having coalesced; the spot beyond the cell whitish; a silvery band near the hind-margin extending from the base to beyond the middle. Hindwing dull reddish-brown, with silvery markings disposed much as above; an ocellus near apex of costal margin similar to but smaller than the one near the anal angle; two indistinct parallel streaks from base to just before anal angle, one marginal; three elongate markings near base, one on costa crossing cell, one within cell, and one extending from base towards disc; a broad fascia from beyond middle of costa to ocellus, avoiding the cell; a spot near apical angle, a broken submarginal streak between veins 4-6. Cilia ochreous, fuscous on the veins. Exp. 40 mm.

Warra, New South Wales.

This species differs from *Xenica Kershawi*, to which it is very closely allied, in having the forewing beneath almost entirely orange-fulvous on the disc, and the hindwing furnished, both above and below, with a broad continuous fascia; the anal ocellus and all the markings are slightly larger, and the latter are rather more brightly coloured.

In conclusion I may add that I am informed by Mr. Charles Waterhouse, of the British Museum, who kindly examined my drawings of *X. Ella*, that the species is distinct from anything contained in the National Collection at South Kensington.

## NOTES AND EXHIBITS.

Mr. Maiden stated that among the plants collected up till now by Mr. Bäuerlen, (*antea* p. 681) were ten species not hitherto known from New South Wales, and these he wished on behalf of Baron von Mueller, K.C.M.G., F.R.S., now to record as additions to the flora of this colony, as follows:—*Pterigium liatroides*, Benth., and *P. microglossus*, Benth., (Compositæ); *Ruellia corymbosa*, F. v. M., (Acanthaceæ); *Gunnia septifraga*, F. v. M. and *Trianthema crystallina*, Vahl, (Ficoideæ); *Atriplex fissifolia*, F. v. M., (Salsolaceæ); *Zygophyllum prismatocarpum*, F. v. M., (Zygophylleæ); *Acacia Murrayana*, F. v. M. (Leguminosæ); *Glossostigma Drummondii*, Benth., (Scrophularinæ); and *Eucalyptus terminalis*, F. v. M., (Myrtaceæ).

Mr. Skuse exhibited a collection of Diptera taken at Berowra on the 10th of September, by Mr. Masters and himself. It contained 250 specimens, chiefly distributed amongst the families

exhibited are :—*H. ater*, Krefft, South Australia ; *H. Damelii*, Günth., Rockhampton ; *H. maculatus*, Steind., Rockhampton ; *H. Mastersii*, Krefft, S. Australia ; *H. Ramsayi*, Krefft, Braidwood ; and *H. spectabilis*, Krefft, S. Australia.

Dr. Cox exhibited a splendid cast of a fine specimen of the Hobart Town Trumpeter (*Latris hecateia*) coloured from life. He had received it from Mr. Saville Kent, by whom it had been modelled.

Dr. Ramsay exhibited specimens of Dendritic Gold in Serpentine and in Mispickel, from the Lucknow Mine near Orange.

Mr. Woodford exhibited a fine collection of Diurnal Lepidoptera collected by himself at Guadalcanar, Solomon Group. Among the most remarkable were *Ornithoptera Victorice* ♂ and ♀, *O. D'Urvilleana* ♂ and ♀, *Papilio Polydorus*, *P. Agamemnon*, *P. Ulysses*, *P. Erskinei*, *P. Codrus*, *Charaxes Jupiter*, *Rhinopalpa algina*.

Mr. Woodford likewise exhibited some birds also from Guadalcanar, among which were *Alcedo bengalensis*, *Cyanalcyon leucopygialis*, *Ceyx solitarius*, *Collocalia* sp., *Hirundo titulica*, *Erythrura* sp. (a beautiful species with deep blue forehead and ear-coverts, probably new), *Pionias heteroclitus*, *Nasiterna finschii*.

(All the foregoing should have appeared as the continuation of the Notes and Exhibits for October, p. 681.)

Dr. Cox exhibited 20 species of Lepidoptera from Victoria, collected by Mr. Kershaw. Amongst them were fine specimens of *Thalaina Clara*, and what Mr. Kershaw considered would turn out to be a new *Charagia*, but which Mr. Masters has pronounced to be a species found about Sydney, the larvæ of which feed on the Tea-Tree in swamps ; also *Xenica Ella* described this evening by Mr. Olliff, *Xenica Kershawi* Miskin, and *Ogyris Orætes* Hew.

Dr. Katz read the following note : " Through the kindness of Mr. E. Stanley, Government Veterinarian of N. S. W., I have been enabled to examine the lungs of a cow, which, suffering from pleuro-pneumonia, was killed. As these diseased lungs were still warm when I received them (11th inst.), they could hardly have

undergone any changes which would have influenced the bacteriological examination. I selected those spots in which the lung lobes were in a state of fresh, light brownish-red hepatisation. On cutting across such spots I obtained an ample quantity of exudation-fluid. Samples of this were derived under proper precautions, and used both for a direct observation under the microscope, and for cultivation purposes. In cover-glass preparations of such material, which, it must be understood, is used as virus for protective inoculations against pleuro-pneumonia in cattle, I expected to find numbers of micro-organisms, especially of the micrococci which Poels and Nolen regard as the cause of the disease; but instead of that (the preparations were stained with Loeffler's methylene-blue) the result was a negative one, inasmuch as I had to search for a considerable time before noticing a specimen that could be pronounced to be a microbe. The cultivation-experiments which I carried out with the same material, using nutrient gelatine, nutrient agar-agar, and the latter medium with 6 per cent. glycerine added to it, also resulted in showing a scarcity of micro-

Mr. Masters exhibited the following mammals sent by Mr. Froggatt from Derby, King's Sound:—Two specimens of *Haplotis Boweri*, Ramsay; *Perameles auratus*, Ramsay; *Perameles* n. sp. (?); *Dasyurus Geoffroyi*, *Belideus ariel*, and a new species of *Phalangista* remarkable for its very short and slender tail.

Mr. A. Sidney Olliff exhibited a specimen of *Peripatus* from Cassilis and in reference to it read the following note:—

“The specimen which I have the pleasure of bringing before the notice of the Society this evening was obtained under a stone at the foot of a grey gum tree by Mr. H. Merewether and myself at Cassilis, whilst searching for insects on the banks of the Mounmoura Creek, a tributary of the Goulburn River. The species is identical with that recently recorded by Mr. Fletcher from Gippsland (see *antea* p. 450) and is probably the *Peripatus Louckartii* of Sanger. It possesses fifteen pairs of claw-bearing appendages and a pair of oral papillæ. When I first saw the creature I was much struck with its resemblance to a caterpillar; indeed, were it not for the antennæ, it might very easily be passed over as the larva of some *Noctua*. It has the habit of coiling itself into a half-circle when disturbed in the characteristic manner of that group, and its gait when in motion is very much the same. During life my specimen was coloured as follows:—shining slaty-brown above, dusted with brick-red, with a dusky red patch on the head, and a moderately distinct dusky red lateral line on each side extending throughout its entire length; below pinkish-grey; the antennæ dark brown. It measured 21 mm. when fully extended. I believe this is the first record of the occurrence of *Peripatus* in New South Wales. The animal is now known from the three eastern colonies—Queensland, New South Wales and Victoria.”

Mr. Macleay exhibited a fine specimen of the *Oligorus*, or fresh water cod, of the Richmond River, recently sent to him by W. C. Bundock, Esq. He said he had compared it carefully with specimens of *Oligorus Macquariensis*, Cuv., and *Oligorus Mitchelli*, Castelnau, the two species known under the name of Murray or

Murrumbidgee cod, and found that its resemblance to the last of these was so complete as to leave little doubt in his mind that they were the same species.

Mr. Macleay also exhibited on behalf of the Rev. J. E. Tenison-Woods a series of specimens of coal fossils from Sarawak, Borneo. He stated that Mr. Tenison-Woods was inclined to think, from some other fossils he had seen, that coal of a much more ancient character existed in Borneo, and perhaps nearly allied to the Newcastle beds of New South Wales.

Mr. Palmer exhibited (1) a Carboniferous fossil (*Pachydomus* sp.) from the top of Connor's Range, Queensland, and (2) a large collection of aboriginal weapons comprising spears, shields, clubs—some of them of remarkable pattern—and boomerangs—several of the latter elaborately carved, in some cases with "totem" marks—obtained by Mr. Thomas Illidge from the blacks of Port Mackay, Queensland.

The President exhibited for the Rev. Mr. Curran rock sections

WEDNESDAY, 28<sup>TH</sup> DECEMBER, 1887.

---

The President, Professor Stephens, M.A., F.G.S., in the Chair.

---

Mr. J. C. H. Mingaye, Sydney, was elected a member of the Society.

---

Mr. T. C. Burnell was present as a visitor.

---

The President announced that there would be no excursion during January ; and that the Annual Meeting would be held on January 25th, to take precedence of the Ordinary Monthly Meeting on the same date.

---

DONATIONS.

"The Medical Times and Gazette," 1859 and 1860 (3 vols. half bound) ; "The Lancet," 1856 to 1860 (9 vols. h. b.) ; "Lancet Advertiser," 1857 and 1858 (2 vols. h. b.) ; "Journal of an Expedition into the Interior of Tropical Australia, &c." By Lt.-Col. Sir T. L. Mitchell, Kt., D.C.L. ; "Narrative of an Expedition into Central Australia." By Captain Charles Sturt, F.L.S., F.R.G.S., &c. &c. ; "Linnæi Systema Naturæ." Tom. I. (Parts 1 and 2), Tom. II. (3 vols.). *From Dr. James C. Cox, F.L.S.*

"Records of the Geological Survey of India." Vol. XX., Part 3 (1887). *From the Director.*

"Zoologischer Anzeiger." Nos. 263 and 264 (1887). *From the Editor.*

"Ueber Naturprodukte der westlichen Südsee besonders der deutschen Schutzgebiete." Von Dr. O. Finsch. *From the Author.*

"Bulletin de la Société Impériale des Naturalistes de Moscou." Année 1887, No. 3. *From the Society.*

"Feuille des Jeunes Naturalistes." No. 205 (November, 1887). *From the Editor.*

"Report of the Trustees of the Public Library, Museums, and National Gallery of Victoria for 1886." *From the Librarian.*



2. *PREPHOTUS HÆMATOGASTER*, Gould.

*P. hæmatorrhous*, Bonap.

The habitat of this species is the interior portions of New South Wales, Victoria, and South Australia, but its range extends also to Tasmania.

For a full set of the eggs of this bird I am likewise indebted to Mr. Joseph Hill, who obtained them at Kewell, Victoria, from the hollow branch of a *Eucalyptus*, on September 15th, 1887. They are seven in number for a sitting, and when found were in a very advanced state of incubation. In form they are rounded ovals, a single specimen only (F) being somewhat sharply pointed at one end, pure white, and the shell very smooth but without any gloss. They measure as follows:—Length (A) 0.94 × 0.8 inch; (B) 0.95 × 0.8 inch; (C) 0.94 × 0.78 inch; (D) 0.97 × 0.76 inch; (E) 0.95 × 0.8 inch; (F) 0.97 × 0.78 inch; (G) 0.97 × 0.8 inch.

**XENORHYNCHUS AUSTRALIS, Latham.**

The Jabiru of the Australian Continent, at one time thought to be specifically distinct from that of India but now recognised to be one and the same species, is widely dispersed over the northern portions of Australia. It is found frequenting the estuaries of rivers as well as the inland marshes and lagoons, from the Clarence River on the east coast to Cambridge Gulf on the north-west, specimens having been procured at the latter place by the late Mr. T. H. Boyer-Bower, and it will undoubtedly be found much farther south when our knowledge of the range of the Western Australian avi-fauna is fully worked out. The great stronghold, however, of this species is the Indian Empire over the principal portion of which it has been found breeding, and accounts of which have been given by various writers. Allan Hume in his valuable work on the "Nests and Eggs of Indian Birds" deals exhaustively with the subject; but it is only within the last few years that it has been found breeding on the Australian Continent.

The nest is a huge flat structure composed of sticks, lined with twigs and grasses, and is usually placed in the high boughs of a lofty tree in the near vicinity of water. Mr. Geo. Barnard found a nest near Rockhampton, Queensland, but the Jabirus did not remain long in undisputed possession of it, owing to the repeated attacks of a pair of Wedge-tailed eagles, (*Aquila audax*) which ultimately caused them to desert it.

I am indebted to Mr. John Leadbeater of the National Museum, Melbourne, for the opportunity of describing these rare Australian eggs, which, he informs me, were taken about four months ago in the Clarence River district, New South Wales. They are oval in form, being nearly equal in size at both ends, of a dull yellowish-white or whity-brown colour, the surface of the shell being smooth but minutely pitted all over similar to those of the yellow-

legged Spoonbill (*Platibis flavipes*), and measure as follows:—Length (A)  $2.93 \times 2.1$  inches; (B)  $2.92 \times 2.12$  inches. These eggs in shape, colour, and size, agree with those described by Mr. A. Hume\* (see *Nests and Eggs of Indian Birds* by Allan Hume, p. 608), the average of forty-five eggs measured by him being  $2.91 \times 2.12$  inches. So also do those of the Australian specimens obtained in the neighbourhood of Ingham at the mouth of the Herbert River, Queensland, in March, 1885, and described in a joint paper contributed to the Royal Society of Queensland by Messrs. W. T. White and Henry Tryon on the 6th of August, 1886 (See *Proc. Royal Soc. Queensland*, p. 139).

---

\* Dr. Ramsay informs me that a pair of these birds were found breeding on the border of Lake Macquarie in 1860. During the last few years young birds have been occasionally forwarded to the Australian Museum and Botanic Gardens, Sydney, showing that the birds breed freely in New South Wales.

## REPORT ON A SMALL ZOOLOGICAL COLLECTION FROM NORFOLK ISLAND.

I. INTRODUCTORY REMARKS.	BY J. A. M. MILLINGTON.
II. REPTILES AND FISHES.	BY J. DOUGLAS OGILBY.
III. MOLLUSCA.	BY JOHN BRAZIER.
IV. INSECTA.	BY A. SIDNEY OLLIFF.

### I. INTRODUCTORY REMARKS.

BY J. A. M. MILLINGTON.

At the instigation of my friend Mr. A. Sidney Olliff, during my recent visit to Norfolk Island, as Assistant to Mr. W. A. Harper, A.M.L.C.E., who was making a survey of the Island, I gathered together such specimens as came under my immediate observation. Unfortunately the time at my disposal was so fully occupied that any attempt at serious collecting was out of the question, and I obtained little but what actually thrust itself upon me when engaged in field-work. Small as the results are, I trust they are not without interest, as I believe that the investigation of isolated faunas like that of Norfolk Island may throw some light on that most important problem, the geographical distribution of animals.

Norfolk Island,\* situated in 29° 2' south latitude, and 168° 1' east longitude, is a well-wooded, fertile, and very rugged island, seven miles in length, with a superficial area of some 8800 acres. On the southern side and closely associated with it are Phillip and Nepean Islands, the former distant about five and the latter half a-mile, which together with a few small bare rocks on the northern side known as the Bird Rocks, constitute the whole of the isolated group.

---

\* For a concise general account of the island, see Dr. C. J. Browning, 'Norfolk Island, its Character and Productions' Proc. Royal Soc. Tasmania, 1859, pp. 195-212.

The birds received no attention from me, and I only obtained three species which are identified by Dr. Ramsay as *Petroica multicolor*, Gm., *Platycercus Pennantii*, Lath., and *Gygis candida*, Gm. In conclusion, I would express my thanks to Dr. E. P. Ramsay, who has offered me every assistance and encouragement in my endeavour to add a little to our knowledge of the fauna of this interesting island. I am also indebted to Captain Franklin Bates, of Norfolk Island, for valuable contributions and assistance. A set of the specimens obtained by me, including the types of the new species, has been presented to the Trustees of the Australian Museum for the public collection of the colony.

## II. REPTILES & FISHES.

By J. DOUGLAS OGILBY.

### REPTILES.

Length of head  $3\frac{1}{4}$  to  $3\frac{2}{3}$ , of caudal fin  $3\frac{9}{10}$  to  $4\frac{1}{10}$ , height of body  $3\frac{1}{8}$  to  $3\frac{1}{2}$  in the total length. *Eye*—Diameter  $2\frac{2}{3}$  to 3 in the length of the head; snout obtuse and short, about  $\frac{5}{8}$  of a diameter of the eye; interorbital space flat,  $\frac{2}{3}$  of the same. Occiput slightly concave; jaws equal; the maxilla reaches to the vertical from the posterior fourth of the orbit; it is dilated behind, and possesses a strong median ridge, which however does not extend to the hinder margin. The outer edge of the vertical limb and posterior half of the lower limb of the preopercle finely and evenly serrated: post-temporal obscurely so. *Teeth*—Villiform in jaws, vomer, and palate. *Fins*—dorsal spines moderately strong, the first minute, the second from  $\frac{2}{3}$  to  $\frac{1}{3}$  of the third, which is the strongest and highest, about  $\frac{2}{3}$  of the length of the head; the origin of the second dorsal is in front of the middle of the total length; its spine is equal to the fifth of the first dorsal, and is about  $\frac{1}{2}$  of the length of the head; its soft portion is elongated and pointed anteriorly, its first ray being almost double the length of the spine. The anal commences beneath the third dorsal ray; its second spine is stronger, but not so high as that of the second dorsal. Ventral fins long, reaching beyond the origin of the anal, and about  $\frac{3}{4}$  of the length of the head; the spine compressed and very strong, equal to that of second dorsal. Pectorals long and pointed, reaching to the vertical from the 13th scale of the lateral line. Caudal emarginate. *Scales*—one or two in front of the first dorsal; between these and the occiput is a naked space, finely striated longitudinally: nine or ten rows of scales between the second dorsal and the base of the caudal. *Lateral line*—Tubes arborescent on the anterior part of the body, little divided on the tail. *Colours*—Reddish-brown, darkest above, many of the scales above the lateral line having one or two distinct darker spots: scales of the back and sides with a pale margin, those of the throat and abdomen pale with a dark margin. A black spot, covering two lateral line scales, opposite the middle of the base of the caudal fins. Head brown with golden reflections on the opercles, and a pair of rather obscure dark bands from the snout through the interorbital space to the occiput. Dorsal, caudal, anal, and

ventral fins brown with a ruddy tinge, the last the darkest; pectorals red with a dark brown basal band. Irides golden and brown.

The description is taken from two specimens measuring respectively  $4\frac{1}{2}$  and 5 inches. Register numbers of types, I. 1398-9.

*Note*.—Since the above was written Mr. Etheridge's party—to whom I had shown the earlier examples—has brought home three specimens, the largest of which measures  $6\frac{1}{2}$  inches, from Lord Howe Island.

#### 2. SCORPIS sp.

The pair of specimens collected are too young to determine with certainty, but are in all probability *S. equispinnis*.

#### 3. CARANX sp.

A single specimen, also too young to determine.

#### 4. MYXUS BLONGATUS, Günth.

Two small specimens.

#### 5. PARMA POLYLEPIS Günth

line, and disappearing on the tail; several obscure orange transverse stripes on the sides not extending to either the dorsal, or the ventral profile. Fins yellow, the soft dorsal and anal with a broad violet margin: a black spot between the two anterior dorsal spines, and one on each side of the base of the caudal fin, *entirely above the lateral line*.

I have decided on describing this species as new with considerable hesitation on account of the resemblance which it bears in many particulars to the *Labrus annulatus* of Lacépède, of which species I at first considered it to be merely a variety; but the greater length of the pectoral fins, and the absence of the subopercular spot (two characters which are specially emphasized by Dr. Günther—Catal. Fishes, iv. p 202), combined with the two conspicuous caudal spots have decided me to allow specific value, at least provisionally, to this form. Both the specimens brought by Mr. Millington are small, measuring  $4\frac{1}{2}$  and  $4\frac{1}{8}$  inches respectively. Their register numbers are I. 1402-3

### III. MOLLUSCA.

BY JOHN BRAZIER.

This small collection of shells is in a very sad state, the specimens nearly all being sea-worn; some of them are peculiar to Australia, and others are allied to New Zealand and Central and Western Pacific forms.

#### 1. SPIRULA PERONII, Lamarck.

*Nautilus spirula*, Linn.; *Spirula lævis*, Gray; *Spirula vulgaris*, Leach.

Three specimens and fragments.

#### 2. MUREX (PTERONOTUS) ANGASI, Crosse.

*Typhis Angasi*, Crosse; *Murex eos*, Hutton.

The six specimens are sadly beach-worn. The species is found in New Zealand, Tasmania, South Australia, and New South Wales.



5. RICINULA (SISTRUM) ASPERSA, Lam

*Ricinula aspersa*, Lam.

Three specimens in fair condition; found also in N  
and other Pacific Islands.

6. RICINULA (SISTRUM) CHAIDEA, Duclos

*Purpura chaidea*, Duclos.

Three specimens very much worn. This species is  
at Lord Howe Island, 450 miles east of Sydney He  
found in Port Jackson, in New Caledonia, and in  
in the North, South, and Western Pacific.

7. RICINULA (SISTRUM) UNDATA, Chem

*Murex undata*, Chem. ; *Murex margriticola*, Brode  
*fiscellum*, Homb. et Jacq. ; *Purpura muricina*, Blai

Two specimens found, one very fair and sligh  
they do not differ from specimens from Central  
Pacific Islands.

8. RICINULA (SISTRUM) TUBERCULATA, Blain

*Purpura tuberculata*, Blainville.

Of the four specimens to hand one is evidently

## 10. COMINELLA ACUTINODOSA, Reeve.

*Buccinum acutinodosum*, Reeve, Conch. Icon. pl. 4, fig. 21.

Six specimens of this species very much sea-worn, are in the collection. I doubt its being a short variety of *Cominella costata*, Quoy. In good living specimens of the former the nodules are acute and sharp-pointed at the angle, and are never rounded except in sea-worn examples.

Mr. Tryon is evidently of opinion that *Cominella glandiforme*, Reeve; *C. Zealandica*, Homb. et Jacq.; and *C. lurida*, Phillippi, are synonyms; but the actual species from New Zealand show that they are quite distinct from *C. acutinodosa*, Reeve, from Norfolk Island, originally given in Reeve, from the Cuming collection, as from South Australia. During my visit to Norfolk Island in 1855, I collected a number of fine specimens under stones at Sydney Bay, but collectors that have been there since have apparently neglected to collect living examples.

## 11. COMINELLA TRITONIFORMIS, Blainville.

*Purpura Tritoniformis*, Blainville; *Adamsia typica*, Dunker, P. Z. S. London, p. 357, 1856.

About twelve examples in fair condition, sea-worn; the species is very common in Port Jackson and on the coast of New South Wales, also at Lord Howe Island.

I wish to call the attention of all Conchologists to the fact of the larval state of this species being described as belonging to the genus *Sinusigera*, d'Orb.=*Cheletropis*, Forbes. In fully adult specimens of *C. Tritoniformis*, Bl., the apical whorls show distinctly the claw or *Sinusigera* character; the larval state of *Purpura succincta*, Martyn, has been described as *Sinusigera*. An extensive series of both species of the *Cominella* and *Purpura* from 3 mm. up to 5, 10-20, show the apical structure of *Sinusigera*.

Mr. Tryon lumps *Purpura neglecta*, Angas, with *Cominella Tritoniformis* as a synonym; the apical or embryonic whorls of

*Purpura neglecta* are quite smooth, and have not the characters of *Sinusigera*. The splendid figure given by De Blainville in the "Nouvelles Annales du Muséum," pl. 8, fig. 18, of his *Purpura Tritoniformis*, need never be mistaken for any other species; Dunker's specific name of *typica* must stand as a synonym.

12. *NASSA* (*ALECTRION*) *SPIRATA*, A. Ad.

*Nassa spirata*, A. Adams, Proc. Zool. Soc. London, p. 106, 1851; *Nassa spirata*, Reeve, Conch. Icon. pl. 2, fig. 13.

The specimens are in very good condition considering that they were found on the beach; the species is also found at Lord Howe Island, and on the coast of New South Wales, at Broken Bay and other places to the north.

13. *NASSA* (*LIINA*) *PAUPERA*, Gould.

*Nassa paupera*, Gould, Moll. Wilkes' Expedition, fig. 330:  
*Nassa (Liina) confusella*, Adams (Proc. Zool. Soc. London, 1851).

brown markings; some are of a dark chestnut brown with two faint transverse white lines in the form of dots. *Voluta pattersonia* of Perry, is an overdrawn figure of *Voluta nucleus*, Lam.; the locality he gives is New Holland. If Perry had been a good authority on the subject of Conchology, his name might have taken precedence of Lamarck and other authors, but he simply ignored the works of other authors such as Linnæus, Chemnitz, &c.

15. ? MITRA (PUSIO) FESTA, Reeve.

*Mitra festa*, Reeve, Conch. Icon. pl. 36, fig. 303.

Specimens, sea-worn.

16. MITRA (SCABRICOLA) sp. ?

Two specimens in fair condition.

17. MARGINELLA (PERSICULA) PULCHELLA, Kiener.

*Marginella pulchella*, Kiener, Coq. Viv. pl. 9, fig. 40.

Seven specimens in very good condition; it is quoted by authors as coming from Sydney, New South Wales; it is not found with us, but has been found at Ceylon by Mr. Geoffrey Nevill.

18. COLUMBELLA VERSICOLOR, Sowerby.

*Columbella versicolor*, Sowerby, Proc. Zool. Soc. London, p. 110, 1832; Thes. Conch. Vol. I., p. 117, pl. 37, figs. 41-46; *Columbella pertusa*, Reeve, Conch. Icon. pl. 26, fig. 161; *Columbella nivosa*, Reeve, pl. 26, fig. 166.

About half a pint of specimens, some in very good condition, others being beach-worn, and smaller than those from Australia, Solomon Islands, New Caledonia, and other Pacific Islands.

19. COLUMBELLA PARDALINA, Lam.

*Columbella pardalina*, Lam. Anim. sans Vert. Vol. X., p. 270; *Columbellina Tyleri*, Gray in Griffith's Cuvier.

A very common species and variable in colour and markings; *C. Tyleri* of Gray runs into *C. pardalina*, Lam.; it is also found at Lord Howe Island and on the coast of New South Wales.

20. COLUMBELLA (MITRELLA) sp. ?

One specimen very much sea-worn.

21. PLEUROTOMA (DRILLIA) sp. ?

Three sea-worn specimens ; they resemble *Drillia Beraudiana*, Crosse, from Port Jackson.

22. STROMBUS (GALLINULA) FLORIDUS, Lam.

*Strombus floridus*, Lam. Anim. sans Vert. 2nd edit. Vol. IX., p. 707 ; *Strombus mutabilis*, Swainson, Zool. Illust. pl. 71, fig. 1 ; *Strombus flammeus*, Link ; *Strombus fuscicornis*, Mörch ; *Strombus epimellus*, Duclos.

Ten specimens in fair condition, although slightly beach-worn : it is also found at Lord Howe Island and along the east coast of Australia. It is a very variable species both in colour and marking, which accounts for its having been made into so many

26. CAPULUS SUBRUFUS, Sowerby.

*Hipponyx subrufa*, Sowerby, Proc. Zool. Society, p. 5, 1835 ;  
Thes. Conch. Vol. I., p. 370, pl. 73, figs. 21-22-23 ; *Pileopsis*  
*subrufus*, Lam.

Six specimens very much worn ; they answer in every respect to  
living examples collected by myself in 1855-56.

27. HIPPONYX ANTIQUATA, Linn.

*Patella antiquata*, Linn. 12th edit., p. 1259, No. 762.

A number of sea-worn specimens to hand ; the species is very  
common on the coast of New South Wales. This may be the  
*Hipponyx foliacea* of Quoy and Gaimard.

28. SOLARIUM (TORINA) PERSPECTIVIUNCULUM, Chem.

*Trochus perspectiviunculus variegatus*, Chem. Conch. Cab. Vol.  
V., p. 134, pl. 173, figs. 1708-1709.

Two specimens found of the typical form, and one of the variety  
*Solarium depressa*, Philippi=*planulata*, Hanley.

29. IANTHINA FRAGILIS, Lam.

*Ianthina fragilis*, Lam. Anim. sans Vert. p. 89.

One specimen of this very common form.

30. RISSELLA sp. ?

Four sea-worn specimens ; two species are recorded by Philippi  
from Norfolk Island, namely, *Rissella flavescens* and *pliculata*,  
Philippi.

31. PLANAXIA (HIXIA) MOLLIS, Sowerby.

*Planaxia mollis*, Sowerby, Genera of Shells, fig. 2, 1821 ; *Stur-*  
*cium* *Brazilianum*, Lam. Anim. sans Vert. Vol. VII., p. 272, No.  
32, 1822 ; *Bucinum loricatum*, Wood. Index Test. 1824 ; *Planaxia*  
*pigra*, Forbes, Proc. Zool. Soc. p. 273, pl. 11, fig. 3 ; *Planaxia*  
*fulva*, A. Adams, Proc. Zool. Soc. p. 271, 1857, *Planaxia*  
(*Hixia*) *brasiliana*, E. A. Smith, Annals and Mag. of Natural  
History, Vol. IX., fourth series, p. 64, No. 62, 1872.

A number of living specimens in the collection. I collected a large number when last at Norfolk Island in 1865.

It is very common on some parts of the coast of New South Wales, at Bondi and Coogee Bays, and on the outer north head of Port Jackson, Point Piper, Watson's Bay, and Lord Howe Island.

Lamarck's name of *Brasilianum* for this species is a misnomer, the shell not having been found in Brazil. I believe the original specimens that came into Lamarck's hands from Madame Paterson came from either Lord Howe Island, Norfolk Island, or New South Wales.

### 32. *NERITA MELANOTRAGUS*, E. A. Smith.

*Nerita atrata*, Reeve (non Chemnitz) Conch. Icon. pl. fig. 16 a.b.; *Nerita melanotragus*, Sowerby, Thea. Conch. part 40, p. 120 (Index), letter-press, pl. 3, fig. 41, 1883; *Nerita melanotragus*, E. A. Smith, Zoology of H.M.S. Alert, p. 69, No. 82, June 1884. *Nerita atrata*, Hutton, Port Linn. Soc. New South

the Mauritius; it is always covered with large white dots, a character that is not to be found in *N. melanotragus*. Professor Hutton named it *Nerita saturata*, but his paper was not published until August 1884. Mr. Smith's name, published in June 1884, therefore, takes precedence.

33. *NERITA ALBICILLA*, Linn.

*Nerita albicilla*, Linn. Syst. Nat. 12th edit. p. 1254, No. 733.

One sea-worn specimen of this tropical species is in the collection.

34. *BULLA AMPULLA*, Linn.

*Bulla ampulla*, Linn. Syst. Nat. 12th edit. p. 1183, No. 378.

Six specimens in fair condition, they being of the smaller variety.

35. ? *SIPHONARIA LIRATA*, Reeve.

*Siphonaria lirata*, Reeve, Conch. Icon. pl. fig. 35, a.b.

The few specimens that are to hand come very near to *S. lirata*, Reeve.

36. *SIPHONARIA CORRUGATA*, Reeve.

*Siphonaria corrugata*, Reeve, Conch. Icon. pl. 6, fig. 31, a.b.

Seven specimens very badly sea-worn.

#### IV. INSECTA.

BY A. SIDNEY OLLIFF.

Information, however meagre, concerning the fauna of so remote a spot as Norfolk Island must of necessity prove highly interesting, more particularly to the geographical naturalist. I have, therefore, drawn up a list of the coleoptera obtained by Mr. Millington adding references to a few species previously recorded from the island. That this list is incomplete I feel assured, as some of the species (*e.g. Enicodes Fichteli*, and among the butterflies, *Papilio amphiaras*) obtained during the early settlement of the island appear to have been confused with collections from the



Australian Continent and are consequently recorded from wrong localities; the descriptions too are scattered in various publications, many of them difficult of access.

With regard to the zoo-geography of the island I would remark that, as far as the insects are concerned, all the evidence points to a near affinity to the Australian sub-region. Although admitting the preponderance of Australian types, Mr. Wallace,\* relying upon the evidence afforded by its bird-fauna, considers Norfolk Island, as well as Lord Howe Island, to belong to the New Zealand subregion chiefly on account of the presence of certain New Zealand genera which are incapable of long flights. Among the Coleoptera the most conspicuous genera—*Lamprina*, *Chiropatys*, *Melobasis*, *Tuxentis*—are all characteristically Australian, and *Metisopus*, the only endemic genus as yet described, is certainly allied to Australian groups. In fact the only typical New Zealand form is *Xyloteles*, a genus of longicorns, which is represented by two closely allied species. The occurrence of *Enicospila*, a remarkable New Caledonian form, is particularly suggestive, and

An abundant species on the Eastern side of the Australian Continent; also found in Lord Howe Island.

DIAPHOROMERUS IRIPENNIS.

*Diaphoromerus (Harpalus) iripennis*, Chaudoir, Bull. Mosc. 1843, p. 105.

Apparently abundant; it is common in Queensland, and I have recently seen it from Lord Howe Island.

STAPHYLINIDÆ.

CREOPHILUS ERYTHROCEPHALUS.

*Staphylinus erythrocephalus*, Fabricius; see *antea* p. 492.

Widely distributed throughout Australia and extending as far as New Caledonia, Tonga, &c.

NITIDULIDÆ.

LASIODACTYLUS CALVUS, sp.n.

Ovate, about twice as long as broad, dark fuscous, somewhat shining, very sparingly and finely pubescent; prothorax and elytra with the margins ferruginous; elytra seriate-punctate, with two testaceous markings at the base, and one on each side of the suture before the middle.

Head finely and irregularly punctured. Antennæ ferruginous. Prothorax at the base about twice as broad as long, slightly emarginate and narrower in front, finely and closely punctured; anterior angles obtuse; the sides arcuate; the posterior angles very slightly produced. Scutellum transverse, somewhat pointed behind, finely and not very closely punctured. Elytra about twice as long as the prothorax, rather finely seriate-punctate, the interstices broad and finely punctured; each elytron with two reddish testaceous spots at the base, one near the scutellum and one at the shoulder, and another less distinct spot on the fourth series of punctures; shoulders not very prominent; sides arcuately narrowed behind. Legs reddish testaceous. Length 4 mm.; greatest width  $2\frac{1}{2}$  mm.

This species appears to be more nearly allied to the Ceramian *Lasiodactylus stelidotoides*\* than any other species, but its more finely punctured and feebly emarginate prothorax, pale-coloured legs, and the different sculpture of its elytra will readily distinguish it.

#### TROGOSITIDÆ.

##### \* *LEPERINA TURBATA*.

*Leperina turbata*, Pascoe, Journ. Entom. II. p. 29 (1863); Olliff, Proc. Linn. Soc. N.S.W., X., p. 705 (1885).

There is a single example of this species from Norfolk Island in the Macleay Museum.

#### LUCANIDÆ.

##### *LAMPYRA AENEÆ*.

*Lethrus aeneæ*, Fabr.; Schreibers, Trans. Linn. Soc. Lond., VI. p. 185, pl. 20, fig. 1 (1802); Macleay, Proc. Linn. Soc. N.S.W., X.,

Scutellum smooth, slightly depressed in the middle, rounded behind. Elytra with the sutural stria strongly marked, extending to just before the apex, the discal striæ somewhat obscured, abbreviated posteriorly, those at the sides almost obsolete, the interstices broad, impunctate; the apex of each elytron strongly, irregularly, and sparingly punctured. Underside pale castaneous; the sterna rather thickly clothed with long silky pubescence. Legs castaneous, tibiæ and tarsi pitchy. In the female, which is the only sex known to me, the anterior tibiæ are tridentate, and the others bicarinate. Length 18-23 mm.

In the absence of the male the generic identification of this species cannot be regarded as certain, but I have little doubt that its position is not far removed from *Chiroplatys latipes*, Guérin.

Four ♀ specimens.

#### BUPRESTIDÆ.

##### MELOBASIS PURPURASCENS.

*Melobasis purpurascens*, Fabricius, Syst. El., II., p. 217.

Four examples.

#### ELATERIDÆ.

##### MONOCREPIDIUS STRIATUS.

*Monocrepidius striatus*, Macleay, Trans. Ent. Soc. N.S.W., II., p. 252 (1872).

Three specimens which appear to be identical with the type of this Gayndah species.

##### MONOCREPIDIUS, sp.

Two abraded specimens of a species closely allied to *M. striatus*.

##### DICTENIOPHORUS RAMIFER.

*Ludius ramifer*, Eschscholtz, Thon. Arch., II., p. 34.

A single ♂ specimen agreeing in every respect with this common Australian form.

**BOSTRYCHIDÆ.**

**RHIZOPERTHA, sp.**

Two damaged specimens of a species allied to *Rhizopertha collaris*, Erichson.

**TENEBRIONIDÆ.**

**HOPATRUM INSULANUM, sp.n.**

Broadly ovate, moderately convex, black, opaque, extremely finely and sparingly pubescent; prothorax finely and closely rugose-punctate, the anterior angles not very prominent; elytra obscurely punctate-striate, finely rugulose.

Head broadly transverse, finely and closely rugose-punctate, somewhat impressed in front, the anterior margin rather strongly emarginate; the sides strongly produced in front of the eyes. Antennae pitchy red, finely pubescent. Prothorax short, strongly

## CURCULIONIDÆ.

## OCYNOMA RHYSA, sp.n.

Fuscous, moderately convex, thickly clothed with greenish grey scales ; prothorax about as long as broad, with an impression on each side of the middle ; elytra seriate-punctate, the interstices interrupted posteriorly with moderately conspicuous nodiform elevations.

Head finely punctured, closely pubescent, slightly impressed between the eyes ; rostrum indistinctly carinulate in the middle ; eyes round, very prominent. Antennæ finely pubescent ; funiculus with the 2nd joint rather longer than the 1st, the others gradually decreasing in length. Prothorax rather more narrowed in front than behind, rather strongly punctured, closely covered with fine scales and pubescence, with an indistinct raised median line. Elytra considerably broader than the prothorax, thickly covered with fine scales and pubescence, rather strongly seriate-punctate, the interstices moderately broad : each elytron provided near the apex with six or seven moderately distinct nodiform elevations ; these elevations vary somewhat in position (in the specimen before me those on one elytron do not correspond precisely with those on the other), but they appear to be confined to the 3rd, 5th, 6th, and 7th interstices. Underside clothed with ashy scales and pubescence. Legs sparingly covered with squamose scales. Length  $5\frac{1}{2}$  mm.

I have experienced considerable difficulty in fixing the position of this species owing to the want of material for dissection ; it agrees, however, with *Ocynoma*, a genus only known to me from description, in the absence of ocular lobes, the great length of the scape, and other essential characters. In *facies* it is not unlike some of the smaller species of *Perperus*.

A single specimen.

*PSEPHOLAX PASCOEI*, sp.n.

Elongate, somewhat narrowed both in front and behind, black, shining; prothorax strongly narrowed in front, moderately strongly punctured; elytra tuberculose at the base, rather strongly seriate-punctate, the interstices strongly raised; each elytron with three ridges of short erect pubescence at the apex.

Head and rostrum finely, closely, and irregularly punctured, the latter short and broad; eyes oval, not very prominent. Antennae rather short, pitchy red. Prothorax about one-third broader than long, much narrower and slightly constricted in front, moderately strongly, irregularly, and not very closely punctured, a small patch of yellowish scales at the base; the anterior margin very slightly emarginate in the middle. Elytra transversely impressed near the base, about two and a half times as long as the prothorax, nearly parallel-sided for two-thirds of their

**PENTARTHURUM MILLINGTONI, sp.n.**

Subfusiform, cylindrical, black, shining; rostrum moderately strongly constricted near the base; prothorax very long; elytra obscurely striate-punctate, interstices moderately broad, finely punctured.

Head rather finely and sparingly punctured; rostrum rather long, more closely punctured than the head. Antennæ dark reddish testaceous, the 1st joint of the funiculus rather longer than the succeeding ones. Prothorax about twice as long as broad, slightly constricted in front, rather finely and closely punctured; the sides moderately strongly rounded. Elytra moderately convex, the striæ somewhat impressed; the sides rounded behind. Legs not very robust, black; the tarsi inclining to reddish testaceous. Length 5-6 mm.

Mount Pitt; three specimens.

**PENTARTHURUM NEPEANIANUM, sp.n.**

Elongate, rather strongly convex, black, somewhat shining; prothorax very coarsely and closely punctured; elytra rather strongly striate-punctate, interstices rather broad, extremely finely and sparingly punctured.

Head rather finely and moderately closely punctured; rostrum short, somewhat narrowed in front, as finely and closely punctured as the head. Antennæ piceous, with the intermediate joints pitchy red; the scape somewhat thickened at the extremity. Prothorax about twice as long as broad, narrowed in front, very strongly and rather closely punctured; the sides somewhat rounded. Elytra moderately long and convex, the striæ rather deeply impressed, the interstices broad, extremely finely punctured and somewhat dull. Legs robust, pitchy red; the tarsi reddish testaceous. Length 4 mm.

This very distinct species, which is from Nepean Island, and the foregoing species from Norfolk Island proper, may ultimately



prove to be distinct from *Pentarthrus*, but as they go very well into that genus in its wider sense I have not thought it necessary to separate them at present. In the absence of the allied genera for comparison, it is scarcely advisable to add to the already too numerous divisions of the *Cossonidæ*.

### CERAMBYCIDÆ

#### TOXETES RASILIS, sp.n.

Elongate, depressed, brown, somewhat shining; mandibles very prominent; prothorax with two short acute spines on each side; the elytra finely, sparingly and irregularly punctured.

Head longitudinally impressed in the middle, strongly and rather sparingly punctured on the disc, rugose near and behind the eyes; mandibles very prominent, incurved, closely punctured. Antennæ about two thirds the length of the body. scape extending just beyond the posterior margin of the eye. Prothorax broadly transverse, somewhat depressed and rather

## CERESIVM SIMPLEX.

*Stenochorus simplex*, Gyllenhal, Schön. Syst. Ins., App. I., p. 178.

A widely distributed and variable species; it is found in Australia, and in the Pacific Islands it ranges from the Philippines to New Zealand, having been known to occur in Manila, Samoa, Tahiti, and Lord Howe Island.

## DIOTIMA UNDULATA.

*Diotima undulata*, Pascoe, Trans. Ent. Soc. Lond. (2), V., p. 58, pl. 2, fig. 9.

This species is found in Queensland on *Araucaria Cunninghami*; in Norfolk Island it confines itself to the allied Norfolk Island Pine, *A. excelsa*.

## DYSTHAETA NAEVIA, sp.n.

Fuscous, moderately convex, closely covered with cinereous pubescence; prothorax with a conspicuous tubercle on each side of the middle; elytra obscurely variegated with fuscous, a tubercle on each side at the base.

Head densely pubescent, with a strongly marked median line. Antennæ fuscous, about as long as the body, the basal joint short, thickened towards the apex, joints 3-11 with the bases clothed with grey pubescence. Prothorax distinctly transverse, densely pubescent, with a stout lateral tooth in the middle, a conspicuous tubercle on each side of the middle just before the lateral teeth. Scutellum rounded behind, densely pubescent. Elytra at the base much broader than the prothorax, narrowed behind, the apex entire, very coarsely and sparingly punctured on the basal half, almost impunctate posteriorly, a few minute tubercles mixed with the punctures near the base; each elytron with a conspicuous tubercle in the middle near the base. Underside ferruginous, closely and finely pubescent. Legs clothed with cinereous pubescence; tibiæ fuscous at the base. Length 15-17 mm.

A very distinct species intermediate in form between the closely allied genera *Dysthaeta* and *Oricopsis*; it agrees with *D. anomala* Pascoe, in sculpture and in having the prothoracic tubercles simple but is less narrowed behind and has a single conspicuous tubercle at the base of each elytron; in colour and marking it is very distinct.

*XYLOTELES PATTESONI*, sp.n.

Elongate, sub-cylindrical, narrowed both in front and behind; pitchy brown, shining, with a coppery tinge; prothorax with a spot of yellowish pubescence in the middle on each side; elytra striate, clothed with fine grey pubescence, sparingly punctured at the base.

Head extremely finely punctured, finely pubescent, with a distinct median line. Antennæ pitchy, finely pubescent, the bases of the joints inclining to reddish testaceous. Prothorax slightly longer than broad, with a few fine scattered punctures, and two deeply impressed transverse lines, one near the anterior margin the other near the base. Scutellum thickly covered with fine yellowish

basal joint robust, the others with the bases finely pubescent and inclining to reddish testaceous. Prothorax longer than broad, with a few extremely fine scattered punctures; a transverse impressed line just behind the anterior margin, and another considerably before the base; an indistinct median line. Scutellum large, rounded behind, thickly covered with fine grey pubescence. Elytra narrowed behind, with a few fine punctures chiefly near the base and along the suture. Underside somewhat shining. Legs robust, pitchy, and finely pubescent. Length 13 mm.

A single specimen of this very distinct species was found under bark.

#### ENICODES FICHTELI.

*Cerambyx Fichtelii*, Schreibers, Trans. Linn. Soc. Lond., VI., p. 200, pl. 21, fig. 9 (1802); Lacordaire, Gen. Col., pl. 102, fig. 1.

A series of specimens, of which the males vary from 17-30 and the females from 18-21 mm. in length, agreeing in every particular with this species. There can be little doubt that the original male specimen of *E. Fichteli*, described in great detail by Dr. Schreibers, was from Norfolk Island. Whether the form recorded from New Caledonia by M. Montrouzier is really identical with *E. Fichteli* I am not in a position to decide; the only species from that locality with which I am acquainted is *E. Montrouzieri*. As far as I am aware *E. Fichteli* does not occur on the Australian Continent.

#### CHRYSOMELIDÆ.

##### COLASPIS sp.

Two imperfect specimens.

#### LEPIDOPTERA.

The lepidoptera obtained by Mr. Millington comprise five species of butterflies, four heterocera, and a few unrecognisable specimens. The species are as follows:—*Danaus plexippus*, Linn., *Pyrameis itea*, Fabr., *Diadema bolina*, Linn., *Pieris java*, Sp., *Papilio*

*amphiarauus*, Feld., *Protoparce convolvuli*, Linn. (var. *distans*, Btl.), *Deiopeia pulchella*, Linn., *Achasa melicerte*, Dr., and *Acidalia rubraria*, Dhl. Of these *P. itea* is found in Australia and New Zealand, *P. amphiarauus* (*ilioneus*, Don.) in New Caledonia, *P. java* in the Malay Archipelago, *A. melicerte* and *A. rubraria* in Australia and Eastern Asia, and *D. bolina* has a wide distribution in the Pacific; the others are ubiquitous. With regard to *P. amphiarauus* I would here point out that we have no evidence of its presence on the mainland of Australia; the specimens recorded by Donovan and others were probably obtained from Norfolk Island.

The Orthoptera are represented by a few obscure species, mostly in bad condition, belonging to the genera *Blatta*, *Acheta* (probably *A. australis*, Linn.), *Locusta*, and *Phaneroptera*; the Neuroptera by *Chrysopa*, and the Homoptera by a small black *Cicada* which I have not been able to identify.

## ON A NEW *PIELUS* FROM THE BLUE MOUNTAINS.

BY A. SIDNEY OLLIFF, F.E.S., AND HENRY PRINCE.

(Plate xxxix).

In this paper we have drawn up a description of the finely coloured Hepialid which was exhibited at the June meeting of this Society. The specimen was found at rest on a treestump at Lawson, in the Blue Mountains, at an elevation of 2,400 feet above the sea level, and had evidently only just emerged from the pupa as the empty case was seen projecting from its subterranean burrow at no great distance. The specimen appears to be a typical male *Pielus* belonging to a very distinct new species. We propose to call it *P. imperialis*.

### HEPIALIDÆ.

#### *PIELUS IMPERIALIS*, sp.n.

♂ Antennæ reddish brown ; palpi bright red. Head and thorax brick-red, the latter brownish in front ; abdomen tinged with purple. Forewing bright brick-red, inclining to brownish red near the hind-margin, with a longitudinal series of large bright silver spots on the disc, extending from near the base to just beyond the extremity of the discoidal cell, and an oblique band of narrow elongate silvery spots, near and parallel to the hind-margin, which does not attain the extremity of the wing ; the discal band composed of four irregular markings, the one nearest the base very elongate and bi-constricted, the second somewhat oblique, the last about twice as long as the third which is situated below the internal apical angle of the cell ; the hind-marginal band interrupted and somewhat incurved in the middle, the markings closely contiguous. Hindwing dull brownish red, brighter along the veins, tinged with bright purple at the base. Underside dull brownish red, all the wings thickly pubescent and purplish near the base. Expanse of wings 135 mm. ; length of body 52 mm.

Lawson, New South Wales (2,400 feet) ; in December, 1886.

In the simple pectinate structure of the antennæ and in all other essential characters this species agrees with *Pielus hyalinatus*, Herr. Sch., but its brilliant colour and conspicuous markings will distinguish it at once from all the known members of the genus.

A female specimen,\* measuring 182 mm., obtained at Katoomba, about eight miles from Lawson, in February, 1884, is probably the female of the form described above; it is without markings and is of a tawny brownish red colour, faintly tinged with purplish on the abdomen and at the bases of the hind wings.

---

\* Both the ♂ and ♀ specimens were collected by Mr. Prince.

**NOTES ON MR. FROGGATT'S COLLECTIONS MADE  
DURING THE YEAR 1887, IN THE VICINITY OF  
DERBY, KING'S SOUND, N. W. AUSTRALIA.**

**BY WILLIAM MACLEAY, F.L.S., &c.**

Mr. Froggatt, the well-known New Guinea Explorer, left Sydney in March last, for King's Sound, with the intention of spending a year, in making a collection for the Macleay Museum of the zoological productions of that part of Australia.

Since his departure I have received from him two consignments of specimens ; the first of them was briefly noticed at our meeting of June last, the other only just received, is now noticed for the first time. I propose in the following notes to give a general sketch of both these collections, in order, so far as they will admit, to give some idea of the character of the fauna of that almost unknown portion of Australia. The Fauna of Port Darwin and its neighbourhood has of late years been pretty well investigated, but that lies nearly 500 miles north of King's Sound and in a very different description of country, while to the south the nearest point until lately visited by naturalists is Nicol Bay, some hundreds of miles distant. My anticipations therefore of finding a widely different fauna with some approach to that of the Dutch East Indian Archipelago, were not altogether unreasonable. The result, however, is quite the opposite. A more thoroughly characteristic Australian Fauna there cannot be. The species are many of them, I may say mostly, new, but they are all of Australian forms and genera, and with one or two exceptions present nothing striking. These observations are general and apply to all the animal divisions, but it is only among the insect



orders that I can speak with certainty, because it is only of them that the collection is sufficiently extensive to admit of tolerably satisfactory evidence. The country actually collected over by Mr. Froggatt is limited to a few miles round Derby, and I am enabled by means of a good geological map of the district sent to me by Mr. Froggatt, to give some idea of the character of the country. The coast on the east side of King's Sound is low and swampy, bounded eastwards by "Pindan" sands and gravels, a pliocene formation which extends inland for upwards of 60 miles, and is backed by limestone ranges of the carboniferous period. Beyond these ranges and from 100 to 150 miles from Derby, the hills are more elevated and consist of metamorphic schists and quartzite, with occasional outbursts of basalt. Along the course of the rivers and rivulets falling into the Sound, are wide deposits of alluvium and river gravel, and large patches of a similar alluvium are found spread throughout the "Pindan," which occupies the undulating country land between the ranges. Through-

water-beetles, and 24 of *Staphylinidæ*, both far above the Australian average. The Lamellicornes number only 17 species, all with the exception of one *Trox*, very ordinary looking things; no *Oetoniidæ* and no *Rutelidæ*. The absence of *Buprestidæ* is still more noticeable, *Stigmodera Duboulayi*, Saund., being the only representative of that thoroughly Australian and almost universally prevalent genus. The Sternoxi generally are very few, the Malacoderms fewer. The Heteromera are few and not in any way remarkable; the *Curculionidæ* are chiefly very minute, and decidedly under the usual numerical proportion to other insects. There are only 16 species of Longicornes, all common forms. The Phytophagous Tetramera are numerous enough. The anomalous character of the collection must not however be too readily accepted as an index of the fauna. Various circumstances may account for the absence of some groups and the prevalence of others; for instance, the paucity of the *Buprestidæ* and anthophilous Lamellicornes may be owing to the season of the year being unsuitable; the end of the rainy season is generally looked upon as the proper time for the appearance of these insects. Again, the disproportionate number of *Carabidæ* such as *Clivina*, *Bembidium*, *Trechus*, and of water-beetles and *Staphylinidæ* may only show that Mr. Froggatt had chiefly collected during the dry season on the alluvial banks of the streams near the coast.

I may state that, as far as I can judge from present observations, quite one-third of the species are new. The Lepidoptera—chiefly diurnal—more resemble those of New South Wales than of North Australia; the beautiful butterflies of Northern Queensland of Papuan affinity are entirely absent, the only *Papilio* being *Sthenelus*, and *Pieris Teutonia* is apparently the most common species. The only novelties are *Danais Petilia* and *chrysippus*. The Orthoptera are few in number, but seem entirely different from those of Eastern and Northern Australia; and indeed the same may be said of the Hemiptera, Hymenoptera, and Diptera; but the collection in these orders is very limited in numbers.

Of Mollusca there are about 20 species of land and freshwater shells of the usual genera, but the species new. There are also in the collection a great variety of other invertebrates in tubes which I have not yet examined. The mammals of this collection were exhibited by Mr. Masters at our last meeting. The birds are few in number, and of the usual West Australian species. The Reptilia are interesting and peculiar. The snakes comprised six species - *Nardoa Gilberti*, Gray; *Dipsas* n.sp., *Brachysoma simile*, Macleay; *Pseudechis Darwiniensis*, Macleay; *Diemenia* n.sp., *Acanthophis* sp. (?). The Lizards are *Varanus Gouldii* and *punctatus*, *Chlamydosaurus Kingii*, *Physignathus Gilberti*; five species of *Amphibolurus*; five species of *Lygosoma*, a new *Cyclodus*, *Ablepharus Boutonii*, *Delma Fraseri*, and six species of *Geckotida*. The River Fishes consisted of three species of *Therapon*, *Aristeus* sp., *Belone* sp., *Gobius* sp., *Chatoessus Erebi*, and *Toxotes jaculator*.

DESCRIPTIONS OF TWO NEW FISHES FROM PORT  
JACKSON.

By E. PIERSON RAMSAY, F.R.S.E., &c., AND J. DOUGLAS OGILBY.

*(Notes from the Australian Museum.)*

TRIPTERYGIUM ANNULATUM, sp. nov.

D. 3/12/11. A. 1/18. V. 2. P. 15. C. 13. L.l. 33. L.tr. 8\*.

Length of the head three and four-fifths to four, of caudal fin five and three-fifths to five and four-fifths, of pectoral fin three and a half, height of body beneath the origin of the second dorsal five and a fourth in the total length. The eye is situated in the upper half of the head and just touches the dorsal profile, its diameter is two-sevenths of the length of the head, and about five-sixths of that of the snout, which is oblique and slightly concave, whereas the occiput is flat. The interorbital space is also slightly concave, and is three-sevenths of the diameter of the eye. The cleft of the mouth is almost horizontal, the upper jaw being the longer, and the maxilla extending to the front margin of the eye. A short simple fleshy tentacle above the middle of the eye. Villiform teeth on the jaws, vomer, and palate, with an enlarged row in front on the jaws. The first dorsal fin commences above the middle of the opercle, and is subequal in height to the two others; the second dorsal commences a little behind the base of the pectoral, and is sub-continuous with the first, while the third commences above the eighth anal ray, and is separated from the

---

\*Counting obliquely backwards from the origin of the third dorsal to the base of the anal fin.

1032 DESCRIPTIONS OF TWO NEW FISHES FROM PORT JACKSON,

second by an appreciable interspace. In the first and second dorsal fins the rays are simple, but in the third all are articulated, as also are those of the anal fin with the exception of the first, which is simple: the middle pectoral rays are the longest, slightly longer than the head: caudal fin rounded. The lateral line is interrupted opposite the termination of the second dorsal fin. *Colors*—red; the head is much darker than the body: base of the pectoral fin dark bluish-black; many of the scales, especially those above the lateral line, with a transverse dusky streak. A conspicuous black band round the free part of the tail. Dorsal fins, especially the first and second, dusky.

Two examples of this pretty little fish, the larger of which is just an inch and a half in length, were obtained early in the present month beneath stones between tidemarks at Vacluse by Mr. Edward McIntosh, who brought them in a fresh state to the Museum.

CONGOMILRENA LONGICAUDA, SP. NOV.

the length of the head. The anal commences beneath the fortieth dorsal ray. *Colors*—uniform pale brownish-yellow; the vertical fins grey with a narrow black margin; irides silvery.

The specimen from which the above description has been drawn up, was picked out from among a number of small eels from the Parramatta River brought by the prawn fishers to the Sydney market, and is eleven and a quarter inches in length. The greater length of its tail distinguishes it at once from *C. habenata*, in which the tail and trunk are subequal

In the description of *Pteroplatea australis* (P.L. p. 575) the following passage occurs:—"Tail . . . spine or rudimentary fin." Of three specimens received after publication of this description (Oct. 1885) two possess rudimentary fin, and one, the largest (37 inches long), possesses a short spine in addition. No other difference is however discernible, and the presence or absence of rudimentary fin alone be held to be sufficient to justify the specific, or generic, separation of these fishes.

In P.L.S.N.S.W. I. (2), p. 131, we described a species from the New Hebrides under the name of *C. variegata*. I have frequently ascertained that Bennett (Fish. Ceylon pl. 100) has given a very fair representation of our fish as *Labrus aureo-maculatus*. Our name necessarily lapses, and the species must be known as *Coris aureo-maculata*. It is necessary to mention that Dr. Günther considers Bennett's fish to be the same as Lacépède's *Labrus cingulum*, while Mr. Bennett has further and unites that author's *C. aygula* with his former name having the priority.

JOTTINGS FROM THE BIOLOGICAL LABORATORY  
OF SYDNEY UNIVERSITY.

BY WILLIAM A. HASWELL, M.A., D.Sc.

8. NOTES ON *Tmesipteris* AND *Psilotum*.

These two remarkable genera are made by Goebel in his "Outlines of Classification and Special Morphology of Plants" (English translation, 1887, p. 282), to constitute a separate division, the *Psilotaceæ*, of the *Lycopodinaë*. The two genera, though differing a good deal superficially, are yet in essential points nearly allied, and quite distinctly separated off from the true Club-Mosses.

*Tmesipteris tannensis*, Bernh., is found growing most commonly on the stems of species of tree-fern (*Alsophila* and *Dicksonia*) sometimes on the ground, in New South Wales and Tasmania. It occurs also in Queensland, Victoria, New Zealand, and the Pacific Islands. The following is the definition of the genus given by Bentham and Mueller in the "Flora Australiensis."\*

"Stems simple, leafy. Leaves vertical, sessile and decurrent, entire, intermixed with leafy bracts bipartite on a short petiole. Spore-cases usually two together, united into a capsule-like sorus, sessile on the petiole of the bracts, transversely oblong, flattened, two-celled and didymous or 2-lobed, opening loculicidally in two valves. Spores minute, uniform."

---

\*Vol. VII. p. 680.



And the following is the description given of the species:—

"Stems from a creeping slender rootstock ascending or pendulous, 6 inches to 1 foot long. Leaves obliquely oblong or narrow lanceolate, usually about  $\frac{1}{2}$  inch long, but sometimes nearly 1 inch, truncate obtuse or acute at the end, the lower margin shortly decurrent, the single central nerve often produced at the end into a fine point. Bracts rather shorter than the leaves and occasionally replacing them in the upper part of the stem, deeply divided into two segments like the leaves but smaller and more acute. Capsule-like sori about 2 lines broad and 1 line long, much compressed, parallel to the petiole."

*Tmesipteris* presents a creeping rhizome and a series of leaf-bearing stems. In nearly all the specimens I have seen the rhizome is found deeply buried in the fibrous coating of the stem of the Tree-fern, while the leaf-bearing axes hang downwards: more rarely the plant is found creeping on the surface of the ground; it branches dichotomously and may attain a length of several feet. None of my specimens have any roots

are elongated in the direction of the long axis of the stem ; the outer wall, in the leaf-bearing part of the stem, but not in the basal part, is irregularly thickened, leaving rounded or slit-like depressions. The cortical tissue is strongly sclerenchymatous in its outer part, with abundant cell-contents, and with numerous intercellular spaces. Internally the walls of the cells are thinner and the cell contents scanty, so that this part of the cortex may be regarded as representing the endodermis. Surrounding the central vascular bundle is a ring of a dark brown homogeneous substance, which is so arranged that it forms continuous branching and anastomosing longitudinal lines breaking through apparently from cell to cell, and thus constitutes a network enclosing the bundle. This brown layer is present in nearly all parts of the stems both creeping and aerial ; it varies in thickness and may sometimes be found to be entirely absent for a short space. When at its thickest it occupies about four layers of cells ; near the growing point of the underground stem it sometimes breaks through into the interior of the vascular bundle, and fills the interior of some of the spiral vessels. This brown matter is solid, and is quite insoluble in water, cold or boiling, in boiling absolute alcohol, ether, chloroform, turpentine, and liquor potassiae ; a similar substance occurs in *Psilotum*, as will be noticed below. Internal to the brown layer there is nearly always a single layer of thin-walled cells not differing from the other endoderm cells, but marked off from those immediately external to them by not containing any of the brown matter. There is a single, central, cylindrical vascular bundle. In the basal leafless part of the aerial stem the scalariform tracheides usually form in transverse section an irregular incomplete ring or a series of groups circularly arranged, surrounded by and enclosing elongated elements with thin cellulose walls, some with long narrow nuclei, others without nuclei, apparently sieve-tubes. The central sclerenchyma found in *Psilotum* is absent. In the leaf-bearing part of the stem the vessels occupy a central position surrounded by the phloëm elements. The vessels are smaller than in *Lycopodium*, the largest being little over  $\frac{1}{1000}$  of an inch in diameter. In transverse sections of

the leaf-bearing parts of the stem there is to be seen another tissue between the epidermis and the cortical layer, not forming a complete zone but arranged in fine masses ; this is the mesophyll of the leaf-ridges, and does not differ from that of the leaves.

The leaves seem not to follow any definite law in their arrangement. In every  $2\frac{1}{2}$  centimetres of the stem there are about five leaves, and of these the fifth is very usually directly over the first. About two centimetres below each leaf begins a longitudinal ridge of the stem, which, at first very low, becomes very prominent towards the base of the leaf. The leaves are situated with one edge directed inwards towards the stem, the midrib of the leaf meeting the stem at an angle of about  $45^{\circ}$ . The leaves are of a long oval shape, on an average a centimetre and a half in length and half a centimetre in breadth, having the base asymmetrically developed, the inner half of the lamina—that turned towards the stem—being more developed than the outer. The inner edge sometimes presents a few indistinct serrations, but in this there is much variation. There is such undulate midrib, which is undulate

lateral branches of *Lycopodium*. The sporangium is situated on the side of this special branch which is turned towards the stem, immediately below the point where it gives origin to the two leaves. It has the form of two cones with their bases in apposition and their apices sometimes slightly bent upwards; the long axis lies parallel with the stem. Each cone is a locus of the sporangium, the two cavities being separated by a delicate transverse septum. Along the ventral side runs a longitudinal suture—the line of dehiscence. When the sporangium dehisces the septum between the two loculi becomes ruptured, and the whole presents the appearance of being unilocular, and of having dehisced by two lateral valves. The wall of the sporangium consists of two layers—the epidermis, the cells of which are cuticularised, but not much thickened, and are elongated in a vertical direction, and a layer of small parenchymatous cells. The median septum contains a fine vascular bundle continuous with the central vascular bundle of the branch on which the sporangium is borne. The spores are  $\frac{1}{200}$ th of an inch in length; they are oval bodies, compressed, and with one side convex, the other concave.

The following is the description of *Psilotum* in the “Flora Australiensis” :—

“Stems dichotomous, with distant notches bearing minute scale-like leaves, sometimes scarcely prominent, occasionally replaced by equally minute bifid bracts. Spore-cases usually three together, united in a capsule-like sorus, sessile in the axil of or attached to the bracts, nearly globular, 3-lobed, 3-celled, opening loculicidally in 3 valves. Spores minute, uniform.”

And of the species—*P. triquetrum*, Swartz,

“Rhizome short, intricately branched. Stems erect, or pendulous when on trees, from 3 or 4 inches to about 1 foot long, repeatedly dichotomous in the upper part, the fertile branches 3-angled, the barren ones usually flattened. Scale-like leaves minute and subulate, the bracts subtending the spore-cases equally small and distant but forked. Capsule-like sori globular, about 1 line diameter, attached to the bract below the fork.”

*Psilotum triquetrum* is much more widely distributed than *Tmesipteris tannensis*, being found in Asia, Africa, and America as well as in the Australian colonies.

It differs considerably in general appearance from *Tmesipteris* owing to its shrub-like habit, the absence of conspicuous leaves and the repeated branching of the erect stems.

The rhizome is cylindrical and divides dichotomously. Its surface is finely striate so as to present a scaly appearance, and is covered with brown hairs. The single small central vascular bundle is of cylindrical form and consists of an inner bundle of scalariform vessels, an outer layer of phloem, with bast cells and sieve-tubes, enclosed in a sheath of short thin-walled parenchyma. Surrounding the sheath is a layer of brown matter similar to that observable in a corresponding situation in *Tmesipteris*, but less strongly developed. It seems to be arranged in longitudinal branching and anastomosing lines which are situated for the most part in intercellular spaces, but seem frequently to break into the cavities of cells. Outside of this is a thick zone of thin-walled

less completely united into a ring. Outside of the vessels is the phloëm which fills in the spaces between the groups of vessels so as to give the whole bundle a cylindrical form. The centre of the bundle is occupied by a strand of sclerenchyma. In the younger branches the sclerenchyma disappears, and the vessels are arranged in a flattened strand surrounded by phloëm. There is no brown matter, or only isolated spiral lines of it, and the endodermis is only distinguishable by its thinner cell-walls. The walls of the parenchyma cells are considerably thickened towards the periphery where their cavities are filled with chlorophyll granules. The epidermis has a very thick laminated cuticle. Stomata are abundant on the stem between the ridges, but there are none on the leaves nor on the ridges. The mesophyll of the leaves and of the leaf-ridges has the same peculiar form as in *Tmesipteris*; numerous short blunt processes from the walls of the cells articulating with corresponding processes from neighbouring cells, numerous anastomosing intercellular spaces being thus formed.

The wall of the sporangium has the same structure as in *Tmesipteris*, except that there are no vessels in the septa.

The spores, of which each sporangium contains a very large number, are of a rather narrow oval outline with a nearly straight ventral, and convex dorsal border. Along the ventral border runs a narrow line which marks the line of dehiscence of the two halves or valves into which the exospore splits to allow of the exit of its contents.

It is not to be wondered at, taking into account the want of success which has hitherto always followed attempts to cultivate the spores of *Lycopodium*, that in repeated experiments with the spores of both *Psilotum* and *Tmesipteris* under various conditions of substratum, light, heat, and moisture, I have hitherto failed to rear the prothallia of these genera.

9. ON THE EMBRYOLOGY OF *Vermilia cespitosa* AND *Eupomatus elegans*.

In both species artificial impregnation is readily effected, and development proceeds with perfect regularity for at least two days in a glass vessel with an occasional change of water. After this period, however, abnormalities become frequent, and soon all the embryos become more or less deformed, until at the end of three or four days they all die off. To make the conditions as nearly as possible natural I reared the embryos in bottles, the mouths of which were closed with a piece of muslin; these were suspended by means of cords from the piles of a jetty in Port Jackson, or were attached to a buoy, the bottles being so placed as to be always immersed, but not far from the surface.

About half an hour after the contact of ova and spermatozoa

the mouth, while in the neighbourhood of the posterior end of the slit the anus is formed at a somewhat later stage.\*

When the process of invagination commences the larva is covered uniformly with cilia; soon, however, the anterior or cephalic end of the embryo loses its cilia, but becomes surrounded just in front of the mouth by a strong præ-oral ciliated band. The epiblast of the cephalic end becomes thinner than the rest except in the centre, where a thicker group of cells remains, destined to give rise to the cerebral ganglion.

The embryo becomes more elongated, assuming the shape of a pear, the broad end being the head and the narrow end the tail. From the centre of the former there grow out in most instances one, or sometimes two, long and slender motionless flagella; but these are frequently absent. The alimentary canal, though still simple in form, has now become densely ciliated internally, and undergoes frequent strong contractions. In sections made through an embryo at this stage, towards the end of the second day, a few, apparently irregularly placed, cells are to be found between the epiblast and the hypoblast; these probably form the foundations of the middle layer.

In the course of the third day the alimentary canal becomes differentiated into distinct œsophageal, gastric, and intestinal regions. The præ-oral circlet of cilia becomes elevated on a distinct slightly oblique ridge, and a reniform eyespot becomes developed at a little distance from the ganglion, and connected with the latter by a fibrous strand. A thin-walled vesicle makes its appearance on the third day at the posterior extremity of the body, and soon attains a considerable size; it is apparently formed by involution of the epiblast, and remains connected with the exterior by a pore at the side of the anus.

---

\*Conn (Zool. Anzeiger, VII.) describes the blastopore in *Serpula* as becoming elongated and closed, the mouth and anus arising at its two ends. Salensky (l.c.) describes the mouth in *Psygmobranchus* as formed independently of the blastopore after the closure of the latter. In *Spirorbis* Götte ("Zur Entwick. der Wurmer" Zool. Anz. 1881, p. 189) states that the blastopore becomes converted into the mouth.



I have failed to followed the history of the embryo further by means of artificial cultivations, but have every reason to believe that I have found a later stage in the larval development of both genera in considerable numbers among the aggregations of their calcareous tubes. The form is precisely similar in both cases, but the larva of the *Eupomatus*, or what I take to be such, found among the *Eupomatus* tubes, is very much smaller, as one would be inclined *a priori* to expect, than that of the very much larger *Vermilia*. There is a broad head-lobe with two pairs of eyes, and, at the sides, tufts of strong cilia, which appear to be the remains of the pre-oral cirlet. The body contains six segments, of which the first three are large and distinct, while the last three are smaller and not sharply marked off. The three anterior segments each bear a pair of bundles of very long and slender, slightly curved and minutely feathered provisional setae, which the larva is in the habit of occasionally spreading out in the form of a fan; the last segment is provided with fasciculi of setae. The dorsal segment is articulated with the pre-oral lobe.

LIST OF HEPATICÆ COLLECTED BY MR. THOMAS  
WHITELEGGE IN NEW SOUTH WALES, 1884-5.

By B. CARRINGTON, M.D., F.R.S.E., AND W. H. PEARSON.

(Communicated by Thomas Whiteleggs.)

(Plates XXII-XXXVII).

1. *FRULLANIA CINNAMOMEA*, n. sp.

Dioicous, fragrant, smooth, pale olive-green to cinnamon brown, irregularly branched, leaves closely imbricated, spreading at right angles with the stem, kidney-shaped, obtuse, entire, lobule large, galeate, pendulous, base tumid, apex acutely beaked, stylus minute, subulate; underleaves approximate, nearly plane, broadly rotund or roundish, emarginate, sinus shallow, obtuse; bracts ovate or cultrate, acute, upper margin entire, lower subdentate, lobule reflexed, evolute, broadly lanceolate, acuminate, dentato-ciliate, bracteole sub-oblong quadrate, or lingulate, bifid, segments acute, margin distantly dentate-laciniate; perianth obovate, trigonous.

Dioicous, resembling *F. deplanata*, Mitt., fronds 2' to 3' in diameter, corticolar, growing in soft, depressed, imbricated tufts, odour fragrant, violaceous, smooth, pale olive-green to cinnamon brown, irregularly branched, fastigiate, convex when dry, 2 mm. wide. Stems slender, flexuose. Leaves closely imbricated, spreading at right angles with the stem which they cross, broadly cordate or kidney-shaped, obtuse, entire, texture thin sub-translucent, slightly polished, cells smallish roundish filled with numerous oil corpuscles, walls irregular, trigones large; lobule large, galeate, pendulous, base tumid and cucullate, apex acutely beaked not spined, mouth

---

NOTE.—Those marked with an asterisk, new to New South Wales.

revolute. Stylus minute, subulate. Underleaves approximate, nearly plane, broadly rotund or roundish, amplexicaul, emarginate, sinus obtuse, shallow (1-5th deep), segments sub-acute, margin entire (not reflexed), umbonate near the base (4 times broader than the stem).

Inflorescence dioicous. Involucre terminal or seated on the crowded branches near the apex of the stem. Bracts ovate, cultrate, acute, upper margin entire, lower sub-dentate, lobes reflexed, evolute, broadly lanceolate, acuminate, dentato-ciliate. Bracteole sub-oblong-quadrate or lingulate, bifid to 1-3rd, segments acute, margin distantly dentate-laciniate, sub-bracteole oblong-oval, bifid, distantly dentate. Perianth projecting, obovate, truncate, trigonous, the third angle postical, antical side convex, smooth with thin margins.

Androeceia lateral forming long linear catkins, bracts much smaller, lyriform, cucullate, compressed, apex with one or two small teeth, antherid' oval, in pairs.

From *F. probosciphora* by its entire underleaves, exserted perianth which is quite smooth, not nearly immersed and rough at the edges.

From *F. deplanata*, Mitt., by the want of the new hay odour, by the perianth in that species being quite compressed not sharply carinate postically; in it also the bracts and their lobules are entire.

In *F. monocera* the margins of the perianths are spinulose.

Lastly in *F. spinifera* the bracts and lobes are more acute and entire, and the perianth narrow and bluntly trigonous.

#### DESCRIPTION OF PLATE XXII.

Fig. 1. Plant nat. size. 2. Portions of stem, antical view  $\times 16$ . 3. Ditto, postical view  $\times 16$ . 4. Ditto, showing lobules and stylus clearly. 5-6. Leaves  $\times 16$ . 7. Portion of leaf  $\times 290$ . 8-9. Underleaves  $\times 24$ . 10. Stylus  $\times 85$ . 11. Bract  $\times 24$ . 12. Bracteole  $\times 24$ . 13. Perianth  $\times 16$ . 14. Cross-section of perianth  $\times 16$ . 15. Portion of stem with  $\delta$  amenta  $\times 16$ . 16-17. Perigonal leaves  $\times 24$ . 18. Antheridia  $\times 85$ .

2\* *FRULLANIA MONOCERA*, Hook. fil. et Tayl.

$\delta$  et  $\varnothing$  cum per.

On trees, Ball's Head Bay, Sydney, Feb., 1885 (7 and 31).

3 *FRULLANIA FALCILOBA*, H. f. T.

Cambewarra, Oct., 1884 (Thorpe) (3 and 6).

4 *FRULLANIA PROBOSCIPHORA*, Tayl.

$\varnothing$  cum per.

On trees near Homebush, Sydney, July, 1885 (18);  $\delta$  Cambewarra, Oct., 1884 (Thorpe) (3).

5\* *FRULLANIA SQUARRULOSA*, H. f. T.

On trees, La Perouse, Botany Bay, June, 1885 (30);  $\delta$  Cambewarra, Oct., 1884 (Thorpe) (3).

6\* *FRULLANIA PENTAPLEURA*, Tayl.

$\delta$  et  $\varnothing$  cum per.

Cambewarra, Oct., 1884 (Thorpe) (3).

7\* *FRULLANIA DIPLOTA*, Tayl.

♂ et ♀ cum per.

Mermaid's Glen, Blue Mts., 3,000 ft., Sept., 1885 (9). On wet rocks, Blackheath, Blue Mts., Sept., 1885 (26).

8 *LEJEUNEA* (*HARPA LEJEUNEA*) *MIMOSA*, H. & T.

♂ et ♀ cum per.

Gore Cove, Sydney, May, 1885 (54).

*Lejeunea rufescens*, Lindenb., Syn. Hep. p. 366, seems to be the same thing, but *L. mimosa* was first published in Lond. Journ. of Bot., 1844, p. 318, n. 65, whereas the 3rd part of the Synopsis pp. 305-464, appeared in 1845.

Of the specimen of *L. rufescens* from Terra Statuum (Hb. Hook.), a fragment remains in Wilson's Herb. named *J. lineata*, Sw. This and the plant from the Auckland Group have a reddish-brown tinge; but Australian specimens are dull, sordid green. The group to which *L. mimosa* belongs is remarkable for the somewhat twisted, dimidiate, ovate leaves, and ovate, involute lobules; the perianth pyriform, pentagonal on section, mouth constructed with a

9\* *LEJEUNEA* (*EULEJEUNEA*) *FLAVA*, (Sw.)

Closely appressed to rocks in a cave, Mossman's Bay, Aug., 1885 (58).

10 *LEJEUNA* (*EULEJEUNEA*) *SUBELOBATA*, n.sp.

Monoicous, small, dull green ; stem sparsely branched ; leaves roundish or roundish-ovate, lobule wanting or very minute, underleaves 1-5th to 1-6th smaller, broadly rotund, bifid to about 1-3rd ; bracts smaller oblong-obovate, lobule half the size oblong-cuneate or lingulate ; bracteole spathulate, emarginate, sinus shallow ; perianth sub-pyriform, 5-carinate.

Growing in shallow layers, or creeping amongst mosses, more slender than *L. serpyllifolia*, of a dull green colour. Stems sparsely and irregularly branched, showing upon a cross-section cells of about equal size, 5-6 diam., 8 cortical. Leaves inserted at an angle of 65° sub-imbricate, slightly concave ; roundish or roundish-ovate to oval, lobule wanting or very minute, 1-12th size of lobe tumid, cells medium size, with thick walls, no trigones. Underleaves 1-5th to 1-6th smaller, distant, broadly rotund, bifid to about 1-3rd. Bracts smaller oblong-obovate, lobule half the size, oblong-cuneate or lingulate ; bracteole spathulate, emarginate, sinus shallow 1-6th deep. Perianth sub-pyriform, 5-carinate angles not winged, rostellate. Androecia forming short spikelets or capitula below the ♀.

*Measurements*—Stems from  $\frac{1}{4}$  to  $\frac{1}{2}$  an inch long, .1 mm. diam., with leaves .75 mm. broad ; leaves .45 mm.  $\times$  .35 mm., .425 mm.  $\times$  .35 mm., 4 mm.  $\times$  .35 mm. ; lobule .15 mm. long  $\times$  .075 mm. high ; cells .03 mm. ; underleaves .2 mm. high  $\times$  .2 mm. broad, seg. .1 mm., .175 mm.  $\times$  .15, seg. .05 mm., .15 mm.  $\times$  .15 mm., seg. .05 .15 mm.  $\times$  .125, seg. .05 mm. ; bracts .3 mm. long  $\times$  .1 mm. broad ; lobule of bract .25 mm. long  $\times$  .05 mm. broad ; bracteole .3 mm. long  $\times$  .15 mm. broad ; perianth .55 mm. long  $\times$  .45 mm. broad, .55  $\times$  .4, .45  $\times$  .3.

*Hab.*—On wet rocks, George's River, Botany Bay, Janry., 1885 (47) ; George's River, Botany Bay, Janry., 1885 (42).

DESCRIPTION OF PLATE XXIV.

Fig. 1. Plant nat. size. 2. Cross-section of stem  $\times 85$ . 3. Portion of branch, antical view  $\times 64$ . 4. Portion of branch, postical view  $\times 85$ . 5. Portion of leaf showing lobule  $\times 85$ . 6. Portion of leaf  $\times 290$ . 7. Underleaf from chief stem  $\times 85$ . 8-9. Bracts  $\times 64$ . 10. Bract-eole  $\times 64$ . 11. Perianth  $\times 64$ . 12. Cross-section of perianth  $\times 64$ .

11 *LEJEUNEA* (*MICROLEJEUNEA*) *GRACILLIMA*, Mitt.

Growing on *Lejeunea flava*, Mossman's Bay, closely appressed to a rock in a cave, Aug., 1885, (58a). On trees, Ball's Head Bay, Sydney, Febry., 1835 (31b).

*Measurements*.—Stems 2 mm. long, with leaves .3 mm. wide, .025 mm. diam.; leaves .2 mm. long  $\times$  .125 mm. broad, .225  $\times$  .125. lobule .1 mm. high  $\times$  .07 mm. broad; foliole .06 mm. high  $\times$  .05 mm. broad, segments .03 mm.

DESCRIPTION OF PLATE XXV.

Fig. 1. Plant nat. size. 2. Cross-section of stem. 3. Portion of branch.

16 *ISOTACHIS GUNNIANA*, Mitt., Fl. Tasm., p. 232.

On rocks, Mermaid's Glen, Blue Mts., Sept., 1885 (12).

17 *ISOTACHIS GRANDIS*, n. sp.

Laxly caespitose, large, rosy brown; stems simple, rarely branched; leaves distichous, closely imbricated, sub-complicate, rotundo-ovate, bifid to about 1-4th, sinus and segments subacute, often trifid, margin entire or with few teeth near the base, texture thin, cells elongate; underleaves smaller, elliptic-ovate, bidentate to 1-3rd, entire or sparsely dentate.

Growing in loose patches of a rosy brown colour. Stems long, flexuose, brown, simple, rarely branched. Leaves distichous, closely imbricated, patent, amplexicaul, sub-complicate, ventricose at the base, rotundo-ovate, bifid to about 1-4th, sinus and segments sub-acute, postical segment often again shallowly bifid, margin entire or armed with one or two teeth near the lower half; texture thin but firm, slightly polished, cells rather large, rhomboidal, 2-3 times longer than broad; walls firm, without trigones. Underleaves smaller than the leaves, plane or more or less convex, elliptic-ovate, bidentate to 1-3rd, sinus obtuse or acute, segments acute, margin entire or armed with a few irregular teeth.

*Measurements*.—Stems from 3 to 4 inches, 3 mm. wide; leaves 3 mm. diam., leaves 1.75 mm. long  $\times$  1.5 mm. broad; segments .5 mm.; cells .07 mm.  $\times$  .025 mm.; underleaves 1.5 mm. long  $\times$  1 mm. broad; seg. .5 mm., rarely 1.75 mm. long  $\times$  1 mm. broad; seg. .35 mm.

*Hab.*—On wet rocks, Lawson, Blue Mountains, June, 1884.

*Obs.*—This large and beautiful species has only been found sterile, yet it is so different from any of the described species that we do not hesitate to consider it a new species.

*Isotachis sub-trifidus* (H. f. et T.) has longer, narrower leaves, with the apices equally trifid.

The generic characters of *Isotachis*, as given in the "New Zealand Flora," are very meagre and imperfect.



the outer rose scales differently shaped, alternate with the sub-  
 jacent whitish teeth or folds of the real perianth. Mr. Mitten  
 has no idea of this interesting character, but as the scales are to  
 be found in *Isotachis Lyallii* and *Gunniana*, I think, things will be  
 there as they are in *Is. serrulata*, and you will understand what  
 the "roughness on its exterior surface" means; in *I. Lyallii* it is  
 called "per. minute tuberculatum." The perianth of *I. Gunniana*  
 is "cylindricum, crassum, rugosum, apice albidum, diaphanum,  
 minute plicatum;" perhaps after this it answers completely the  
 perianth of *Jung. serrulata*, and if this is true of other species  
 a more interesting character can be safely affirmed of this  
 genus than Mitten suspects; I have named you five plants,  
 which show this character in the most distinct manner; *Is.*  
*multiceps* does it less, but I found them too. This will be a little  
 addition for your paper on New Zealand Hepaticæ."

## DESCRIPTION OF PLATE XXVL

Fig. 1 Plant nat. size, 2 Portions of stem  $\times 16$ , 3 7. Leaves  $\times 16$ .

**22\* LEPIDOZIA CENTIPES**, Tayl. Syn. Hep., p. 201.

Under shady rock ledges, Mossman's Bay, Decr., 1884 (5);

On wet clay in caverns and shady places, Gore Cove,  
Sydney, July, 1885 (50); Blue Mts., Sept., 1885 (12).

**23\* LEPIDOZIA CAPILLARIS** (Sw.) Prodr. Fl. Ind. occ., Lindenb.,  
Syn. Hep., p. 212.

North Willoughby, July, 1885 (57).

**24 LEPIDOZIA GRACILLIMA**, n. sp.

Dioicous (?), caespitose forming entangled ascending tufts, flagelliferous, slender, pale green. Fronds pinnate, linear, gracile, filiform, somewhat rigid, branches approximate divergent, alternate, short, postical or lateral. Leaves distant, erecto-patent; quadrate, quadrifid; cells smallish to median size. Androecia on short lateral or postical branches.

Plants forming soft pale green tufts, stramineous beneath, flagelliferous, graceful; fronds pinnate, pinnæ short, divergent, of nearly equal length, so that the outline is linear. Stem about the thickness of horse-hair (on cross-section 7 and 8 cells in diam., cortical cells 12 much larger), flagella capillary at the base leafy, branches short, alternate, lateral or postical; rootlets confined to the under stem. Leaves distant except on branches where they are more approximate, not much broader than the stem, obliquely patent, cuneate, sub-quadrate, palmate, quadrifid to about a third sometimes half the length, segments incurved, slightly divergent patent, usually 4 cells long, 2 or 3 diam. at the base. Underleaves about as broad as the stem, quadrate, quadrifid to about a third, segments equal; cells sub-quadrate, translucent, smallish to medium, sized, with thin walls, no trigones. Inflorescence dioicous. Involucra wanting. ♂ Amentula on short lateral or postical branches consisting of 6 to 15 pairs of perigonal leaves, imbricated, ventricose, ovate, bifid, antheridia oval.

*Measurements.*—Stems 1 to 2 inches long, with branches 5 mm. wide, .175 mm. to .2 mm. diam.; leaves .3 mm. long × .3 mm. broad, seg. .1 mm., .25 × .275, seg. .1, .25 × .25, seg. .1; cells .03

1046 LEPIDODIA COLLECTED BY MR. T. WHITELEGGE IN N. S. WALES,

mm. ( $\cdot 05 \times \cdot 02$ ,  $\cdot 04 \times \cdot 02$ ,  $\cdot 03 \times \cdot 02$ ,  $\cdot 025 \times \cdot 025$ ); underleaves  $\cdot 175$  mm. high  $\times \cdot 2$  mm. broad, seg.  $\cdot 075$  mm.,  $\cdot 15$  mm.  $\times \cdot 175$ , seg.  $\cdot 075$ ,  $\cdot 15 \times \cdot 175$ , seg.  $\cdot 075$ ; perigonal leaf  $\cdot 2$  mm. long  $\times \cdot 15$  mm. broad; perigonal underleaf  $\cdot 15$  mm. long  $\times \cdot 075$  mm. broad; antheridia  $\cdot 075$  mm.  $\times \cdot 05$  mm.

*Hab.*—On wet rocks, Botany Bay, June, 1885, ♂.

*Obs.*—This pretty little species appears distinct from any described form. In the distant leaves and their shape it bears a superficial resemblance to *Lepiduzia procera*, Mitt., which however is a much more robust species and in which the branches are secund and all seem to be capillary at the apex, with cells of stem 20 across, whilst this has only 7 or 8.

The leaves also are more erect and 4 to 5 times larger than the underleaves.

(In some respects our species resembles *L. capilligera*, Ldbg., but that is not half the size, with irregular ramifications and patent

- 25 *LEPIDOZIA* (TELARANEA Spr.) LONGISCYPHA, (Tayl.), Lond.  
Journ. of Bot., 1846, p. 280.

♂ et ♀ cum per.

Waterloo Swamps, in boggy places, May, 1885 (40) ♂ et ♀  
cum per. In bogs, Coogee Bay, May, 1885 (38, 39).

Quite distinct from *Lepidozia setacea*.

- 26 *BAZZANIA* NOVÆ-HOLLANDIÆ, (N.) Syn. Hep., p. 221.

On rocks, Northwood, Lane Cove River, Aug., 1885, (27).

On rocks, Fitzroy Falls, Moss Vale, Nov., 1884 (1.)

- 27 *BAZZANIA* ANISOSTOMA, (L. et L.) in Lehm. Pug., pl. VI. p. 58.

Lane Cove River, Aug., 1885 (14). Ball's Head Bay, Oct.,  
1885 (41).

- 28 *LEMBIDIUM* DENDROIDES, n. sp.

Fronde ascending from a creeping filiform pale rhizome, sometimes tuberous at the base, dendroid, apex circinate; stems thicker, irregularly bipinnate, branches lateral postical, confined to the upper half, sub-fasciculate, either simple or bearing one or more ramuli, leaves contiguous vertically patent, divergent, amplexicaul, convex-conduplicate, subcordate, 4 rarely 5 spinose-dentate, apical teeth larger, connivent, with a shallow obtuse sinus, second tooth about half way down each margin—apex cucullate. Underleaves pyramidal apex truncate and bearing 3-5 closely set ciliate teeth, the inner ones longest, basal margin spurred, fertile branches short postical, involucre bracts 2-3 rows ovate acute, 3-4 subulate-dentate at the apex. Perianth 0 (?), pistillidia numerous.

Dioicous (?). Plants growing in loose tufts of a dull green colour. From a creeping rhizome the stems ascend, pinnate or sub-bipinnate, bare near the base, fleshy, flagelliferous, flagella deflexed. Stolons long, white, often filipendula at the extremity, the tubers fusiform and of a brown colour; outer layer of large distinct cells, inner hyaline, on a cross section cells of stem large 8 × 10, 15 cortical larger, delicate thin walls. Branches curled, distant, lateral or postical, deflexed at the apex. Leaves transversely inserted in two rows, alternate or sub-opposite, imbricate convex-conduplicate, sub cordate, 4 rarely 5 spinose-dentate, when flattened out

1048 HEPATICÆ COLLECTED BY MR. T. WHITELEGGE IN N. S. WALES,

roundish-quadrate and notched near base; cells rather large, oblong-quadrate, no trigones. Underleaves as broad or slightly broader than the stem, on the branches 2-3rds as broad, contiguous; pyramidal or sub-conoid from a broad base, divided for 1-3rd of the length into 3-5 narrow teeth which are closely appressed to each other. Involucre on short postical branches. Involucral bracts 3 pairs, the innermost smallest, outer pair ovate to ovate-acuminate more or less dentate at the apex, pistillidia linear, long, about 15. Perianth 0 (f). Male (f).

*Measurements.*—Stems about  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch long, .2 mm. diam, with leaves .55 mm. wide; leaves flattened out .8 mm. long x .55 mm. broad; cells,  $\frac{1}{20}$  mm., .06 mm. x .04 mm.; underleaves .35 mm. high x .33 mm. broad; segments .125 to .15 mm.; outer bracts .5 mm. high x .4 mm. broad, and .7 mm x .5 mm.; middle bracts 1.1 mm. high x .6 mm. broad; inner bracts .8 mm. high x .5 mm. broad; pistillidia .2 mm. long x .05 mm. broad.

*Hab.*—On wet earth, Mermaid's Glen, Blackheath, Blue Mountains, 3,000 feet. September 5, 1885.—T. WHITELEGGE.

- 29 *CEPHALOZIA* (*ZOOPSIS*) *SETULOSA* (Leitg.) S. Leitg. Mittheil. des Naturw. Ver. für Steiermark, (1876).

Mossman's Bay, June, 1885, and ♀ wet rocks, Gore Cove, July, 1885 (60). On wet rocks, Northwood, Lane Cove River, Aug., 1885. On wet rock ledges, Longville Creek, Sept., 1885.

- 30 *CEPHALOZIA* (*ZOOPSIS*) *LEITGEBIANA*, C. et P., Proc. Royal Soc. Tasm., 1887.

Clay banks, Ball's Head Bay, June, 1885, (44, 48), Oct., 1885 (62).

- 31 *BLEPHAROSTOMA PALMATUM*, Lindb. Lond. Journ. of Bot., July, 1887.

Cambewarra, near Moss Vale (C. Harris), Sept., 1885, (63).

- 32 *LOPHOCOLEA HETEROPHYLLOIDEA*, N., Syn. Hep., p. 157.

♂ et ♀ cum per.

Mossman's Bay, June, 1885 (45).

- 33 *CHILOSCYPHUS FISSISTIPUS*, H. f. T. var. *LONGIFOLIUS*.

(*CHILOSCYPHUS LONGIFOLIUS*, C. et P., MS.)

An undoubtedly striking form of this variable species, the linear oblong leaves separate it from the type; in the male stems the leaves are shorter and have a few teeth on the superior margin agreeing with original specimens from Taylor.

The *Chiloscyphus fissistipus* figured by Prof. Manolongo "Ep. Terra d. Fuego" t. 18, f. 16 is quite different from the original, and from Taylor's description, the underleaves being simply dentate not "laciniis ciliato-dentatis."

*Measurements*.—Stems about an inch long, with leaves 5 mm. wide; stem .3 to .4 mm. diam.; leaves 2.5 mm. long × 1.25 mm. broad; cells .04 mm.; underleaves 1.25 mm. high × 1.75 mm. broad; bracts 1.75 mm. long × .75 mm. broad; bracteole 1.25 mm. long × .75 mm. broad; perianth 3 mm. long × 1.25 mm. broad; perigonal leaf .75 mm. long × .4 mm. broad; lobule .5 mm. high × .3 mm. broad; perigonal underleaf .3 mm. long × .15 mm. broad.

*Hab.*—Mossman's Bay, Sydney, June, 1885 (52).

1052 HEPATICÆ COLLECTED BY MR. T. WHITELEGGE IN N. B. WALES,

to below the middle, lobes ovato-acute, ciliate, connate with the sub-quadrato bracteole, which is bifid to below the middle, lobes ovato-acute, lobate at the base. Perianth terminal, half-immersed, elliptic-ovate, deeply 5-6 plicate, unistrata, mouth slightly contracted, slightly dentate. Pistillidia numerous (25). Male plant not seen.

*Measurements.*—Stems about 1 inch long, .4 mm. diam., with leaves .3 to .4 mm. wide; leaves 2.25 mm. high  $\times$  .2 mm. broad; seg. 1.4 mm., 2.25 mm.  $\times$  2.25 mm.; seg. 1.5 mm.; cells .025 mm., .03 mm., .04 mm. ( $\frac{1}{2}$  mm.); underleaves 1.5 mm. high  $\times$  1.75 mm. broad; bract 1.5 mm. high, 2.25 mm. broad, seg. .75 mm. long; cilia .15 to .3 mm. long; underleaf from branch .1 mm. high  $\times$  1.6 mm. broad, seg. .6; perianth 1.6 mm. long  $\times$  1.1 mm. broad; pistillidia .15 mm. long  $\times$  .5 mm. broad.

*Obs.*—This very beautiful species has a peculiarity rarely observed in any other hepatic. The cilia, which are most numerous (25) are scattered on an underleaf, and are not united

**38\* JUNGERMANNIA TASMANICA**, Tayl., var.

Mossman's Bay, Sydney, Dec., 1884, June, 1885.

**39\* LEIOSCYPHUS CHILOSCYPHOIDES** (Lindenb.) Mitt., Lehm. Pug. VIII., p. 4.

♂ Cambewarra (C. Harris), Sept. 1885, (47), (63); Mermaid's Glen, Blue Mts., Sept., 1885 (17).

**40\* CALYPOGEIA UNGUICULATA** (H. f. T.) S.

On wet rock ledges, North Willoughby, July, 1885 (57). In bogs, Marubra Bay, near Coogee Bay, May, 1885 (39).

**41\* BALANTIOPSIS DIPLOPHYLLA** (H. f. T.) Mitt.; *Jung. diplophylla*, Lond. Journ. of Bot. (1844), p. 377.

Gore Cove, Sydney, July, 1885 (49); Ball's Head Bay, Aug., 1885 (56).

**42 SYMPHYOGYNA INTERRUPTA**, n. sp.

Dioicous; fronds linear, procumbent, olive-green, margin entire, repand-undulate, interrupted below, mid-rib strong, fleshy, with a narrow central ligneous band, brownish, projecting, and flexuose, on the under surface clothed with long flaxen rootlets; lamina transverse, or more or less connivent; innovations either continuous with the central axis or postical; fertile bracts oblong or obcuneate, distant, about as broad as the nerve, 5-6 ciliate-dentate; two or three cilia are also found attached above the base of the bracts; pistillidia about 12; calyptra long, clavate, bearing at the apex the abortive pistillidia, capsule oblong, dividing into 2 or 4 valves attached at the apex; elaters numerous, reddish-brown, filiform, bispiral; spores roundish, minute, smooth.

Growing in straggling patches of an olive-green color. Fronds rather large, linear, procumbent, margin entire, repand, undulate, much and irregularly interrupted below, midrib strong, fleshy, with a narrow central ligneous band, brownish, projecting and flexuose, on the under surface clothed with long flaxen rootlets; lamina transverse, or more or less connivent, innovations either continuous with the central axis or postical.



*Obs.*—This is the smallest species of the genus known to us. It differs from *Riccardia palmata* (Hedw.) in its pale-green color, unaltered when dry, more bipinnate ramification, plano-convex section, marginal row of cells, and its gemmiparous terminal branches.

In *R. palmata* the section is bi convex and the margin blunt.

DESCRIPTION OF PLATE XXXIV.

Fig. 1. Plants nat. size. 2-3. Fronds  $\times 16$ . 4. Upper layer of frond  $\times 290$ . 5-8. Cross-sections of frond  $\times 85$ . 9. Club-shaped cells magnified.

---

46\* *RICCARDIA CRASSA* (Schwaegr).

Northwood, Lane Cove River (28).

47 *METZGERIA FURCATA*, N.

Bell's Hort. Boy. Feby., 1885, (31). Canbywara, Sept.

hemispheric laminate scales having a purple waved line at the base. Surface of frond compact, laevigate but bearing minute scattered papillæ. Rootlets numerous, papillose within. A cross-section of the frond shows in the upper half the cells arranged in very regular columnar series; below this the structure is chlorophyllose—the investing membrane is composed of larger lozenge-shaped cells. Capsules deeply imbedded in the fronds. Spores slightly punctate, narrowly bordered.

*Measurements*.—Plants 10 to 15 mm. long; segments 4 to 5 mm. broad, 1 mm. thick; spores .075 to .011 mm. diam.

*Hab.*—Parramatta, N.S.W., August 1885.

*Obs.*—This appears to be a new and distinct species, and we fail to identify it with any of Taylor's species from New South Wales. In *Riccia acuminata*, Tayl., with which it agrees in form, the margin is entire. Its large size and remarkably firm fleshy cartilaginous (when dry) texture might lead one to refer it to *Corrinia*, or another genus which it resembles in size, but the presence of the immersed capsules at once determines it.

*R. marginata* belongs to the "Squamose-fimbriate" sub-section of Lindenberg, the best-known species of which are *R. nigrella*, de Cand., and *R. squamata*, Nees; both of these are covered with roundish purple scales which cover each side of the frond, whereas the scales of *R. marginata* are inserted on the same plane as the surface, are whitish, with purple base, and are only inflexed when dry.

*R. lamellosa*, Raddi, is cream-coloured and the scales oblong, white, and inserted a little below the margin, over which they bend.

*R. fimbriata*, Nees, (Mart. Fl. Brazil) appears like ours in the transverse insertion of the scales, but these are in two oval series, and the whole surface is studded with large, hyaline, conical papillæ, and the section of the frond cavernous.

1058 HEPATICÆ COLLECTED BY MR. T. WHITELEGGE IN N. S. WALES,

DESCRIPTION OF PLATE XXXV.

Fig. 1. Plants nat. size. 2. Plant enlarged. 3-6. Cross-sections  $\times 16$ . 7. spores  $\times 85$ .

49 RICCIA BULLOSA, *Link.* var. VEBICULOSA.

Fronde obovate, bilobed, pale silvery green, lobes linear or cuneate, obtuse, emarginate, obsolete canaliculate, section trigonous, upper half cavernous, honey-combed, epidermic layer thin, composed of much smaller cells, rugose, and in the old fronds pitted.

Plants forming whitish patches. Fronds 3-4 lines long by 1-2 broad, fleshy, bluntly trigonous on section, bifurcate, segments linear, transversely sulcate, narrowly canaliculate, margin rounded and waved, epidermic layer cavernous, looking under the micro-

## DESCRIPTION OF PLATE XXXVI.

Fig 1. Fronds nat. size. 2. Frond  $\times 16$ . 3. Portion of upper surface of frond magnified. 4-9. Cross-sections of frond  $\times 16$ .

---

50 *RICCIA ASPRELLA*, n. sp.

Fronds gregarious, flabellate, punctate, pale frosted green, segments obovate or obcordate, emarginate or bilobed, thin and firmly attached to the ground; plane but with margins slightly raised near the apex, rounded, fringed with minute scattered cilia. Capsule large. Spores minute, dark-brown, sub-rugose.

Growing in irregular flabellate patches, sometimes overlapping, firmly attached to the ground, small, pale glaucous green, generally concolorous beneath, but the old portion brown or discoloured. Fronds thin, bifurcate, obovate, obcordate or cuneate, segments emarginate, plane, of almost equal thickness, margin somewhat raised near apex, rounded on the upper surface, ciliate, cilia irregularly distributed, two or three rows deep, short, subulate, when fresh the surface is beautifully pitted, the epidermic cells large and thick-walled, with a central umbo like the markings on a thimble, section of nearly equal thickness, inner layer chlorophyllose.

Rootlets short, frequent. Capsules numerous, spores dark brown, minutely verruculose, about 200 in a capsule.

*Measurements*.—Fronds 4 to 5 mm. long; lobes 2.75 mm. broad, .4 to .6 mm. thick; cilia .3 mm. long, .06 mm. broad at the base, .25 mm. long, .035 mm. broad at the base, .2 mm. long, .075 mm. broad at the base, .175 mm. long, .03 mm. broad at the base; capsule .7 mm. diam.; spores .01 mm. diam.

*Hab.*—On earth, head of Double Bay, Sydney, July, 1885.

*Obs.*—*Riccia crinita*, Tayl., the only other ciliated species recorded from Australasia, has the margin of a deep purple color, cilia much more numerous, very long and acicular.

1060 HEPATICÆ COLLECTED BY MR. T. WHITELEGGE IN N. S. WALES.

This new species resembles in the pale frosted color some forms of *R. glauca*, mistaken by Hooker for *R. crystallina* L., but its closest alliance is with *R. glaucoscens*, Carr., in which however, the margin is tumid, purple beneath, and with more scattered and larger cilia.

DESCRIPTION OF PLATE XXXVII.

Fig. 1 Fronds nat. size. 2. Frond  $\times 16$ . 3. Portion of Cross-section  $\times 24$ . 4-7. Cross-sections  $\times 24$ . 8. Cells magnified. 9-11. Cilia  $\times 85$ . 12. Capsule  $\times 24$ . 13. Spores  $\times 85$ .

## CONTRIBUTIONS TO CONCHOLOGY, No. 1.

BY JAMES C. COX, M.D., F.L.S.

(Plates xx. and xxi).

### 1. HELICARION SOPHIÆ, Gaskoin.

(Plate xx. Figs. 8-9).

Originally described by Gaskoin in Proc. Zool. Soc., 1854, p. 152, as *Helix Sophia*.

Figured in Reeve's Con. Icon. Vol. II. *Helix*, pl. 196, fig. 1377, as *Helix Sophia*.

*Nanina (Hemiplecta) Sophia* in Pfeiffer's Nomenclator Helicorum viventium (sub-section Ecarinatae), p. 49, 1881.

Figured in Tryon's Manual Conch., Pulmonata, pl. 16, fig. 26, Vol. II.; description at p. 83 as *Nanina Sophia*. The figure of it as given here is much too conical.

Also figured and described in other works.

This is a true *Helicarion* and not a *Nanina*; the animal now figured is not entirely retractile within the shell, and the posterior end has a large dorsal projection and mucous pore.

### 2. PARAPHANTA BUSBYI, Gray.

(Plate xx. Fig. 6).

Originally described in Ann. Mag. of Nat. Hist. 1841, Vol. VI., p. 317, as *Helix Busbyi*.

*Nanina (Paraphanta)*, Pfeiffer, Nomen. Hel., 1881, p. 34. Shell figured in Reeve, Conch. Icon. Vol. II., pl. 164, fig. 11, and in many other works.

Tryon's Manual, Conch., Pulmonata, Vol. I. p. 127, pl. 26, figs. 23-24.

The animal drawn from life by Mrs. E. Forde.



ascends and becomes lost  
striation appears worn off

Columella arched, adna  
the lower end of the colu  
is whitish soiled-looking  
upwards as a narrow mar  
The aperture is oval with  
round, the peristomal suri  
black; the interior of th  
dark band which borders  
of the shell internally.

19 mm.; length of aper  
aperture 22 mm.; from  
14 mm.

*Hab.*—New Ireland (I

#### EXPLA

Figs. 1-2.—*Bu*  
,, 3, 4, 5.—*He*  
,, 6.—*Pa*  
,, 7.—*Rh*  
,, 8, 9.—*He*

## ON A SUPPOSED NEW SPECIES OF *NOTOTHERIUM*.

By C. W. DE Vis, M.A.

For some time it has appeared with increasing probability that the series of Nototheroid jaws forming part of the Queensland collection includes representatives of a *Nototherium* distinct from *N. mitchelli*, Ow., distinct also from *N. inermis*, Ow., a species which has not as yet been met with by the collectors or friends of the Museum. The suspicion originally based on the very backward position of the inlet of the dental canal in a mandibular fragment, was partially confirmed by a mandible retaining one of its premolars; but this tooth was ground down almost to its base, and although it presented appearances irreconcilable with those which would probably be yielded by a premolar of *N. mitchelli* (as identified by Sir R. Owen) similarly abraded, it did not, or rather could not, in such condition inspire full confidence in its distinctiveness. All such ground for hesitation has however been removed by the acquisition of a lately adult jaw in which the premolar is well preserved; the specific differences displayed by it are obvious, and may be allowed to determine the presence of a third species in the drifts of the Darling Downs, for which may be proposed the name, if an excusable one,

### *NOTOTHERIUM DUNENSE.*

Diagnostic characters:—Tusk-like incisors well developed; premolar ( $p^3$ ) small, subtriangular, unilobate; inlet of dental canal much behind postmolar angle and much above alveolar level; exterobasal ridges of molars interrupted; talons anterior and posterior well-developed; molars gradually enlarged; inner symphysial curve opposite hinder lobe of  $m^1$ .





premolar.

Length from tip of incisor

Length of molar series

Length of diastema

External height to tip of ear

Length of incisor from tip of ear

Length of  $p^3$ ...

Breadth of  $p^3$

Length of  $m^3$ ...

Breadth of  $m^3$

The changes which occur in the species during the period of development observed in the examination of the skull which allusion has already made is a rather aged mandible. The alar expansions are the increased depth of the mandible depending thickening of the specific character of the dental canal which has a distance equal to the distance dorsad by an extension of the canal; this is terminated; this is

has become a long outwardly sloping area forming with the hinder end of the intra-coronoid groove a broad surface for muscular insertion; its angle is more acute and sharply labiate. The convexity of the hinder part of the inner mandibular wall is much more pronounced consequent upon the development of the fangs of the posterior molars; the concavity beneath is therefore apparently greater, but the reflection of the angle remains as feeble as before; absorption resulting from compression, itself the result of the forward march of the molars, has removed so much of the ante- and post-talons that the entire length of the series is considerably reduced. Since, however, the youngest tooth  $m^3$  is on one side nearly worn down to its basal ridge while the premolar is still in place and function with its fangs intact, it is probable that the forward movement of the teeth is not a rapid one; and from the position of the outlet of the dental canal beneath the forefang of the premolar compared with its position in the much younger individual in which it is barely anterior to that fang, it would seem probable that the progression of the teeth in *Nototherium* is never carried on to the same extent as in the deciduous-toothed Macropods. The extero-lateral ridge of  $m^3$  sends up a vertical process on the hinder lobe and, running further across the fore lobe than in the younger example, forms with the adjacent edge of the ante-talon a low flat process on that lobe also; showing that its condition is liable to individual variation. The premolar is planed down to its base, but enough enamel remains to show as on a plan the limitations of its original form, the single lobe with its pre-basal ridge or lip and post-basal talon; on the inner angle of this, however, a flat surface has been formed which, without the teaching of the more perfect tooth, would have suggested the former presence of a tubercle or small lobe in that position.

External height to basal ridge of $m^2$	...	...	98 mm.
Length of molar series	...	...	166 mm.
Length of $m^3$ ...	...	...	41 mm.
Height to sigmoid notch	...	...	203 mm.
Length from $p^3$ to back of condylar process	...	...	287 mm.

In a third example, No. 5482, the hinder half of a horizontal ramus equal as to age with the one last-mentioned, the following individual differences appear—still greater depth, 117 mm.: increased retrogression of the inlet of the dental canal, and an advance of  $m^3$  slightly beyond the root of the coronoid process. A fourth specimen with  $m^3$  one-third worn has probably been derived from a middle-aged female; it has the same comparatively slender proportions and rounded external form as the young adult male, but the teeth are narrower though not shorter, and the dental canal commences much further from the postmolar angle than the length of  $m^3$ ; the height to the basal ridge of  $m^2$  is 84 mm. The tubercles at the entries of the valleys in  $m^1$  occur again in a fragment with a young tooth of that symbol attached; these tubercles are therefore in the present species occasional, but not, as surmised by Sir R. Owen in the case of *N. victoriae*, constant. Several (six) other more or less mutilated fragments referrible to *N. dumeroni* occur in the collection; they do not however enable one to add anything to the record.

NOTES ON A NEW DIPTEROUS INSECT BELONGING  
TO THE FAMILY *CECIDOMYIDÆ* INFESTING  
GRASS; ALSO ON TWO HYMENOPTEROUS IN-  
SECTS PARASITIC UPON THE FORMER.

BY FREDERICK A. A. SKUSE.

At our meeting in May last, Mr. Macleay exhibited some malformed grass, which he described as infested with a minute grub, which lived in the stem and caused a thickening of it, and which he suspected to be the grub of a minute dipterous insect, probably belonging to the family *Cecidomyidæ* or gall-gnats. Subsequently Mr. Macleay handed the grass over to me for investigation. When I first saw it I recognised the larvæ and habits of the *Cecidomyidæ*, and I have since carefully watched for the advent of the perfect insect. On December 5th, the first imagines emerged, and they have continued to come out in a very irregular manner up till the present time. Only a small number of the flies have emerged compared with the quantity still remaining in the larval state. This evening I have for exhibition a box of specimens illustrating almost the whole life-history of the insect in question.

The fly belongs to the genus *Lasioptera*, and although the habits of this species are in some particulars similar to those of the so-called "Hessian-fly" (*Cecidomyia (Diplosis) destructor*), which has for more than a century proved exceedingly destructive to wheat in America and elsewhere, the two insects are very distinct in appearance and belong to totally different genera. It is not at all likely to attack wheat, or in fact anything but the species of grass upon which it has been discovered, as most of the larvæ of the gall-midges live exclusively in a certain species of plant only. Further than this—each species always attacks the same part of a particular plant;

## NOTES AND EXHIBITS.

A Note on *Echinaster decanus*, Müll. and Trosch. By Professor F. Jeffrey Bell, M.A., Corr. Mem. Linn. Soc. N.S.W.

It may be of interest to the members of the Linnean Society of New South Wales to learn that one of the results of Dr. Ramsay's dredgings in Port Jackson has been the discovery of the exact habitat of a rare species, which, had it been described by naturalists less masters of their subject than Müller and Troschel, might be said also to be little known. The specimen sent me by Dr. Ramsay was taken in the trawl off George's Head last May; it is rather more than five inches in spread, and is remarkable for the large size of the pore-areas; in these there are a number of respiratory processes, and I expect

Dr. Ramsay exhibited the rare starfish *Echinaster decanus* alluded to in Professor Bell's note. The specimen was taken off George's Head, Port Jackson; it has also been taken under rocks, at low tide, on Shark Reef. He also exhibited four species of *Phalangista* from the Bellender-Ker Ranges, *P. lemuroides*, *P. Archeri*, *P. Johnstonei* and a probably new species; and of birds specimens of *Scenopœus dentirostris*, *Ptilorhis Victoriae*, *Heteromias cinerifrons*, and *Monarcha canescens*.

Dr. Cox exhibited living specimens of *Helix Maconelli*, Reeve, from the Heads of the Pine River, and the Mary River in Queensland, and *H. Falconari*, Reeve, from Ballina, on the Richmond River, with the object of showing how remarkably similar the animals are, the former being a little darker than the latter, and less nodose on the surface. A specimen was also exhibited of a shell quite intermediate between these two species, having the exserted spire of *H. Maconelli*, with only a slight umbilicus quite unlike what usually exists in *H. Falconari*.

Dr. Cox also exhibited a fine specimen of the rare *Trigonia Strangei*, A. Adams, which was dredged near the Heads of Port Jackson by Mr. J. Brazier. This is about only the second living specimen recorded; dead valves are thrown up often in large numbers at Long Reef outside Port Jackson Heads and at Wollongong; but, odd to say, it has not been dredged in a living state by any of the scientific expeditions which have visited these shores.

Mr. Whitelegge exhibited examples of the species of *Hepaticæ* described in the paper by Dr. Carrington and Mr. W. H. Pearson.

Mr. Smithurst exhibited a Crystalline Petrification formed in four years by a drip of surface drainage upon a steam boiler, at Beaconsfield, Tasmania.

Mr. Maiden exhibited a collection of Plants from the country between Wilcanuia and Milparinka. Also, seeds of *Eremophila Sturtii*, and *Clianthus Dampierii*, for distribution; and a specimen of Graphite from the only workable deposit yet met with in N.S.W.

Mr. Masters exhibited some specimens of *Danaïs Petilia*, Stoll, and *Danaïs Chrysippus*, Linn., with the following explanatory note:—

“Among a considerable collection of Rhopalocerous Lepidoptera made by Mr. W. W. Froggatt, at or near King’s Sound, N. W. Australia, during this summer, I find several specimens of what is without doubt the *Danaïs Petilia*, Stoll; and as it is a species about which many mistakes have been made, a short explanatory note seems not undesirable. *Danaïs Petilia* was first described and figured in Stoll’s Suppl. to Cramer’s Papil. p. 132, Pl. 28, fig. 3, (1790), and again described by Godart in the Ency. Method. Hist. Nat. t. ix, p. 139-41 (1819). Both these authorities give as the habitat of the species, China, the Coromandel Coast, and the Island of Java. I cannot say when Australia was first given as a locality, but I think that in Doubleday and Westwood’s “Genera of Diurnal Lepidoptera” Vol. 1, published in 1850, the only habitat given for *Danaïs Petilia*, Stoll, is “Australia generally.” In the same pub-

mistake is now evident, and is traceable as far back as Doubleday and Westwood's work of 1852, though whether it was antecedent to that or not I cannot ascertain. It seems remarkable that so many Lepidopterists should have quietly accepted the name of *D. Petilia* for an insect, which in no way answers to Stoll's Plate nor to the description given by Godart. The common *Danaus chrysippus* may, in Australia, differ in some minute details from those of other parts of the world, but it never can be mistaken for *D. Petilia*, which I have now for the first time seen in specimens from King's Sound, North-west Australia."

The President exhibited for Dr. Woolls:—From Mount Wilson: *Tmesipteris Tunnensis* (Bernh.), from caudices of tree ferns; *Prasophyllum nigricans* (R. Br.); *Cryptostylis leptochila* (F. v. M.), rather rare; *Bæckeia linifolia* (Rudge), common in swampy places; *Atkinsonia ligustrina* (F. v. M.), a terrestrial mistletoe; *Boronia pinnata* (Sm.), *B. microphylla* (Sieb.), by some regarded as varieties; *Symphyonema montanum* (R. Br.), *Hakea propinqua* (Cunn.). From Cobar: *Eucalyptus viminalis* (Labill.) (a new habitat). From Mudgee: *Aira caryophyllea* (Linn.), 10 miles from Mudgee (new habitat); *Dodonæa attenuata* (Cunn.), 20 miles from Wellington; *Brachycome decipiens* (Hook.), from hills near Mudgee, worthy of cultivation; *Veronica serpillifolia* (Linn.), common near Two-mile Flat; according to Bentham, a variety of *Indigofera australis* (Willd.) var. *minor* (F.v.M.); *Loranthus linophyllus* (Fenzl.), on *Casuarina Cunninghami*; *Gnapholodes uliginosum* (A. Gray); *Pittosporum phillyræoides* (DC.); *Cheiranthra linearis* (A. Cunn.), flowers of a rich dark blue. From the Lachlan: *Atalaya hemiglauca* (F.v.M.); *Petalostylis labicheoides* (R. Br.) (new habitat).

Mr. Mitchell exhibited a remarkable concretion in appearance like a cast of the interior of a large Cucurbitaceous Fruit, from an unknown locality in the neighbourhood of Bungonia; also photographs of six species of Trilobites from Bowning.

Mr. North exhibited Eggs of *Platycercus Barnardi*, *Psephotus hæmatogaster*, and *Trichoglossus chlorolepidotus*.



Mr. Skuse exhibited a box of specimens illustrating almost the whole life-history of the new Dipterous insect referred to in his Note.

Mr. Ogilby exhibited *Tripterygium annulatum* and *Congromurena longicauda*, as described in his paper. Also, *Hoplocephalus ornatus* (1) from the Macquarie River, and *Psewlechia australis*, a species mainly confined to the plains of the west.

Mr. Fletcher exhibited, for Mr. De Vis, left ramus of lower jaw of *Nototherium*, n. sp., exhibiting 3rd molar unworn, and the premolar very little abraded.

Mr. T. W. Edgeworth David, B.A., F.G.S., exhibited specimens of rocks and rock-sections, and in reference to them read the following notes:—

(1) On the occurrence of Basalt-glass (Tachylite) in the Vegetable Creek district, New England:—

No previous mention has been made, as far as the author is aware, of the occurrence of this trifurcated, aculeated, and in

- (5) As thin linings to steam-holes formed in basalt.
- (6) As thin surface-films on stalactites in caves in basaltic lava.
- (7) As extensive lava-sheets as at Hawaii in the Sandwich Islands, and the Friendly Islands (?).

In Europe basalt-glass is a comparatively rare rock, being restricted in its occurrence to the first six modes described, its massive development at Hawaii, and perhaps at the Friendly Isles, being quite exceptional. In all the other cases, except the two last, it has been formed through a local rapid cooling of the basalt lava; those portions which cooled more slowly having their base more or less completely devitrified.

At Vegetable Creek basalt-glass occurs as small ejected blocks, or lapilli, of the size of walnuts, and these have been cemented in places, chiefly by sphærosiderite (?), into a fine volcanic agglomerate. The lapilli have been found on the surface of the basalt near the E. side of portion 70, parish of Arvid, and the agglomerate near the N.E. corner of portion 171, parish of Scone, to the S. of Reynold's selection. The lapilli are of irregular shape, subangular, and pitted superficially with steam-holes. The colour of the weathered surfaces is dark brownish-grey, and that of freshly broken surfaces black, with a resinous or pitchy lustre. The hardness is about 6. The fusibility is about the same as that of natrolite, the fused bead being of a brownish black colour. The powder of the basalt glass is not magnetic, or only very feebly so.

Thin slices of this rock, seen under the microscope, show that it is micro-porphyrific in structure, consisting of a translucent, brownish-yellow, glassy magma in which occur micro-porphyrific crystals of olivine, and a few of augite, both enclosing crystallized magnetite, microscopic crystals of triclinic felspar and augite, and spherulites, and globulitic strings traversing the magma and in places following the cracks. The glass remains perfectly dark under crossed nicols, with the exception of some locally devitrified portions. The glass is traversed by a network of cracks running irregularly, or grouped zonally round the large olivine



The latter are frequent in length, and the b  
Spherulites are told  
rings of clear and  
the nucleus assum  
central cavity is of  
separated, by sharp  
merge into it. I  
growth was concre  
spherulitic structure  
outwards, or whether  
and extended itself  
The sharp line of de  
of the spherulites an  
similar to that of a  
transition from the n  
sition that their origi  
of spherulites in obsi  
It is a remarkable fa  
from the base, being  
felspar crystals, and s  
insides of gas-pores in  
powder of this rock n  
from most of the E  
combined with the a  
COVER :- P

and multiple-twinned. The sides of the microscopic crystals parallel to the principal axis are sharply defined while the ends are frayed out. They are arranged tangentially round the large grains of olivine. From this disposition, and from the absence of evidence of corrosion, it would appear that they were formed at or near the surface of the volcanic orifice, and were not derived from great depths. The olivine grains on the other hand appear to be "erratics," like the large augite crystals, as may be inferred from their rounded outlines, the corrosion they have undergone, which in some cases has allowed glassy material from the base to penetrate to the heart of the crystal, and from their size as compared with the microscopic crystals, some of them measuring one-twelfth of an inch in longest diameter. A few of the olivine crystals are traversed by cracks along which greenish or reddish-brown decomposition-products have formed. The majority however are remarkably free from alteration and show clear boundaries. The edges, however, when examined under a  $\frac{1}{4}$  inch power, are seen to be systematically corroded or fused along certain parallel lines (probably the solution planes of the crystal) so that the edges appear to be ribbed like a file, or toothed like a saw. For a short distance from the edges of the olivine crystals the glassy base has become devitrified possibly owing to the highly heated olivine grains keeping the temperature of the glass surrounding and interpenetrating them at a higher temperature than the rest of the glass, and so allowing it to cool more slowly, which would of course favour its devitrification near the point of contact. One of the larger olivine grains is penetrated by a steam-pore, or minute tube, the inside of which is partly coated with partially devitrified glass, which has assumed arborescent forms; and in another part of the same crystal is another minute steam-pore coated with black dendrites, probably dusty magnetite which formed simultaneously with the dendritic magnetite in some of the cracks in the glass during the cooling of the lava. The pore extends from the centre of the olivine grain to its outer surface where it empties into another pore, which in turn passes into a line of globulites in the glass. A very significant fact is the



of the magnetite.  
of eruption was cer-  
evidenced by the de-  
lized magnetite in t  
have been formed :  
produced the lapilli,  
reaching the surfac  
few larger crystals o  
have crystallized p  
consequently these c  
Magnetite occurs in  
dates. Firstly in we  
fine dust forming an  
felspar crystals, and  
the olivine grains and  
the magnetite is foun  
forming enclosures i  
crystals.

*Summary.*—The mi  
sketched in these n  
inferences as to their  
eruption which produc  
magnetite must have  
regions, which may ha  
basaltic eruptions. (T  
at least )

enough, or the conditions of cooling slow enough, to allow of the separation of the iron from the silicates in the form of magnetite. Then towards the commencement of the newer eruption the rock in which the crystals were embedded became liquified, and these crystals entangled in the molten glass were carried upwards to the top of the volcanic orifice. Here part of the lava may have been thrown into the air, and fallen as lapilli, either on to the ground or into water. As no flattening out of the lapilli was observed the latter may have been the case. The crystallites [the trichites and belonites] and perhaps the microscopic crystals of felspar did not begin to form before the lava began to cool, and thus grouped themselves tangentially around the micro-porphyrific crystals of olivine and augite. The pent-up liquid and gaseous enclosures in the olivine and augite in the lapilli, on the relief of pressure consequent on reaching the earth's surface, probably burst their way out through the sides of the crystals leaving tube-like pores resembling shot-holes, and escaped through the glass to the outer surface of the lapilli, the pores afterwards becoming lined with dendritic dusty magnetite at the same time that magnetite was separated out in the same form along the cracks in the cooling glassy base. Spherulites, and possibly strings of globulites, formed in the base while it was cooling. The latter in one case distinctly follow a crack traversing olivine augite and felspar crystals as well as the glassy base, which renders this explanation doubtful. These globulites can scarcely be referred to palagonite as they are feebly doubly refracting. The zonal cracks surrounding the olivine may have been due to that mineral cooling more slowly than the surrounding glassy base, and so shrinking slightly after the solidification of the glass, which has been suggested as a reason for the partial devitrification of the latter at its point of contact with the olivine. In connexion with this question it would be interesting to determine the relative conductivities of the basalt glass and the olivine.

(2) Note on the occurrence of Dacite at Moss Vale:—

This rock may be described as a microcrystalline quartzose hornblende andesite. It is composed of felted crystals of triclinic felspar,



A similar rock b  
containing less free  
Vegetable Creek D  
Vale.

(3) On a Pitchst  
structure :—

The microscope  
brownish-yellow ser  
threads of clear gl  
field remains dark  
by occasional gas-pe  
age of this pitchstor  
found on the East o

(4) On the occur  
at Strathbogie, near

The author is not  
discovered in New S  
a very remarkable va  
the author, so that it

The rock consists  
about one-fortieth o  
precise character of v

Chiastolite crystal  
frequency through th

The spherulitic bodies are mostly elongated in the direction of flow, and some exhibit a faint internal fibrous radial structure.

The base appears to be composed of magnetic iron, and some small clear grains, some of which are singly refracting and may be leucite. This rock has not yet been found *in situ*. The only other similar specimen seen was found in the shape of another stone hatchet in the parish of Scone, Vegetable Creek, about four miles distant from the spot where the first specimen was picked up.

The second rock has a base similar to the first, crowded with spherulites, but in place of the chiastolite are several clear crystals about one-twelfth inch in diameter, giving six-sided sections with clear interiors and thin black borders. All these crystals remain dark under crossed nicols.

Both these rocks appear to be lavas, which gives additional interest to the occurrence in them of chiastolite, a mineral usually associated with metamorphic rocks.



THE historians of  
claim or deserve th  
now closed as an ep  
it may for the mome  
is distracted from t  
plicity of fantastic  
sion so suggestive o  
these words before  
therefore rather wit  
depressing experienc  
already resounding in  
indigestion and deep  
of celebration very  
empty (though doubt  
"our noble selves."

And a philosopher  
is not a stage, that the  
growth is imperceptit  
and so forth. But

Friday and Christmas Day. So let us as philosophers, but nevertheless also as units of humanity (which is the more important) join with the unphilosophic in their unreasonable but natural rejoicings. Yet we must observe that our Society through all the turmoil steers an undeviating course. This meeting is held precisely as if there were no other gatherings to compete with it in attraction, just as a certain proportion of the necessary order of life must be maintained throughout the gayest festivities of fashion.

This day one hundred years ago, the first Governor of New South Wales sailed in the *Supply* from Botany Bay, with a detachment of marines, to occupy ground for the settlement of the infant colony on the shores of Port Jackson, a harbour which had been discovered on the 21st by a boat party, fitted out to explore Broken Bay in the hopes of discovering a more favourable site than could be obtained near Point Sutherland, the Botany Bay rendezvous. On the 24th the French exploring ships, *Boussole* and *Astrolabe*, had appeared off the mouth of the Bay, but were unable to enter owing to a strong westerly gale until after the departure of the *Supply*. Of these ships and their gallant crews no direct news was ever obtained after their departure from our shores, M. de Lesseps bringing the latest intelligence to Europe by way of Kamschatka.

This coincidence in arrival of French and English ships upon an almost unknown spot at the antipodes of European civilisation is a singular introduction to our brief but extraordinary history.

The point however to which I would draw your special attention for one moment is the extraordinary courage or audacity which led the British Government to establish this outpost at the Antipodes. The whole western coast of America was Spanish. The Aleutian Islands, Kamschatka and Okhotsk, were Russian. Japan, China, and Austral India were hardly counted as units under the solidarity of nations. The Philippines belonged to Spain; Java and Ceylon to the Netherlands. The Indian trade was under a vexatious monopoly, against which the merchants of Sydney contended

for many years, though with ultimate success. The Mascarene Archipelago was in the hands of the French, the Cape of Good Hope of the Dutch. A more isolated position can hardly be imagined than that of Sydney; and during the early years of this colony the consequences of this isolation were severely felt. And a more trying and responsible office can hardly be conceived than that of the first governor, a man of extraordinary fertility of design and unparalleled resolution. It is commonly, whether from ignorance or malignity, asserted that the British, no longer able to transport their criminals into enforced servitude in the American colonies, selected this extremity of the habitable globe as a convenient spot for disposal of refuse. But those who have taken the trouble to ascertain the facts, know that it was philanthropy, and not mere selfishness, that dictated the course then pursued. The first impulse however, which may be studied in the inaugural speech of Governor Phillip, whether altogether authentic or not, was almost lost sight of in the brutalising distrac-

were beginning to heave and rend, was chosen for the inauguration of a Greater Britain at the Antipodes. Such boldness of conception, such defiance of illfortune, such stubborn perseverance have justly earned the prosperity which we now celebrate.

This Society has lost during the last year seven members removed in the course of nature, whose names I here record.

Edwin Daintrey, who died last October, was a gentleman of highly cultivated literary tastes, at one time Honorary Secretary to the Australian Library in Bent-street. He was an excellent Botanist, and took a lively interest in all branches of Natural History.

Dr. Markey, L.R.C.S.J., &c., arrived in the Colony in 1865, and practised successfully in Maitland, Casino, and Sydney, where he was also Resident Surgeon of the Infirmary for more than two years.

Mr. W. J. Weston died June 4, 1887.

Mr. F. Tenison-Woods, who died June 1887, after being engaged for many years in the Customs Department, Sydney, gave, until his health broke down, valuable services to the Society and to the cause of science in general. His position naturally supplied constant opportunities for picking up the 'curios' which are so often lost or dispersed after their arrival in Sydney, and of these he made good use.

Mr. Patrick Hayes died December, 1887.

The Hon. W. Busby, M.L.A., was a colonist of very long experience. He assisted his father in his excavations for "Busby's Bore," commenced in 1827, for the purpose of supplying water to Sydney from the Botany Swamps, and was, strange as it sounds to us, sent to Norfolk Island, at that time the inner jail of Botany Bay, to prosecute his education under better teaching than could then be obtained in Sydney. His reminiscences of old times were, as may well be imagined, both curious and interesting.

Spencer Fullerton Baird, born in Pennsylvania, 1823, Secretary to the Smithsonian Institution at Washington, and author of many works upon the Zoology of North America, was appointed (1871) United States Commissioner of Fish and Fisheries, for the purpose of inquiring into the causes of the decrease of the food fishes of the United States, and the methods of restoring them. In this capacity, as in others, his labours were of great service not only to America, but to the whole civilised world. He was elected an Honorary Member of this Society January, 1883, and deceased August 19th, 1887.

H. R. Labatt, a younger son of the late well-known Dr. Labatt, of Dublin, arrived in the colony about 1839. He was engaged in the survey of Manero, New England, and Maryborough, and was for some time in charge of the roads in the County of Cumberland. After this he acted as manager of Gragin Station, the property of Messrs. Cheke and Broadhurst, but subsequently returned to the public service in the Harbours and

later date. A few references to European publications have also been added.

The Library of the Society has been increased, as usual, by exchanges and donations of very considerable value. Among the donations the following seem to deserve particular mention; the Hon. William Macleay has presented large collections of scientific periodicals and of other works, especially upon Ichthyology and Fish Culture, Ornithology and other branches of Natural History; we have also received important contributions to the Library from Baron v. Müller, Dr. Cox, Dr. Ramsay, Mr. Ratte, Dr. Katz, Mr. G. A. Tucker, Dr. Dixon, Mr. Sangster, Mr. H. C. Russell, Rev. J. E. Tenison-Woods; also from the Governments of New South Wales, Victoria, South Australia, Queensland, and Tasmania; as well as from the various Societies with which we are in correspondence, amounting altogether to a very considerable mass of scientific literature.

## ZOOLOGY.

### MAMMALS.

Mr. K. H. Bennett gives an account of the Invasion of the West of N.S.W. by *Mus Tompsonii* (p. 447). Dr. Ramsay describes *Perameles auratus*, n.sp., *Antechinus Froggatti*, n.sp., and *Mus Burtoni*, n.sp., all from Derby, N.W.A.

Proc. Roy. Soc. Qld. Vol. III.—On a new species of *Dendrolagus*, C. W. de Vis, M.A. (p. 11).

On *Pseudochirus Forsteri*, n.sp., a Phalanger from N.G., Ann. and Mag. XIX., 1887, (p. 146), and on *Nesonycteris Woodfordi*, n.sp., and *Pteropus grandis*, n.sp., from the Solomon Islands, P.Z.S., 1887, p. 320. By Oldfield Thomas, and on *Perugale leucura*, n.sp., ib. XIX. (p. 397).

### BIRDS.

Mr. K. H. Bennett describes the Nidification of *Pachycephala*, sp. (p. 103). See also note by R. D. Fitzgerald, Junr., p. 970.

Dr. Ramsay contributes a list of Birds collected in N.W.A. by the late Mr. T. H. Boyer-Bower (p. 165), describes *Phalacrocorax occidentalis*, n.sp. (p. 676), *Gerygone Thorpei*, n.sp. (p. 677), Eggs of three sp. of sea birds (p. 678), *Epimachus Macleayana*, n.sp. from N.G. (p. 239). Mr. A. J. North gives notes on Australian Oology (pp. 405, 554), and Dr. Haswell an elaborate memoir on the early stages in the development of *Dromaeus Nova Hollandie*, with abundant illustrations (p. 576).

Proc. R. S. Tasm. 1886.—Systematic list of Tasmanian Birds. Collected by Col. W. V. Legge, F.L.S. (p. 237). Note on the genus *Ephthianura* (p. 247).

Roy. Soc. Vic. XXIV.—On production of colour in Birds Eggs. A. H. Lucas, M.A. (p. 53).

Proc. R. S. Qld. 1.c.—The Birds of Charleville. Kendal Broadbent (p. 23). Nest and Eggs of *Xenorhynchus Australis*. W. T. White (p. 136).

Proc. Inst. N.Z. l.c.—On the occurrence of *Zootoca vivipara*, an English sp., introduced no doubt in plant cases. T. W. Kirk (p. 67). On the embryology of *Naultinus* sp. a viviparous lizard of N.Z. W. Colenso, F.R.S., (p. 147).

On *Nephrurus platyrus*, n.sp. G. A. Boulenger, Ann. and Mag. XVIII. (p. 91).

#### ICHTHYOLOGY.

Dr. Ramsay and Mr. Douglas Ogilby define the generic characters of *Perca* (introduced) *Percalates*, n.g., *Lates*, *Psammo-perca*, *Ctenolates*, and (incl. *Murrayia* and *Riverina*) *Macquaria* (p. 184), and describe n.sp. of *Dules* (p. 4). *Carcharias* (p. 163). *Chærops*, *Labrichthys* (p. 242). *Opisthognathus*, *Trichiurus*, *Neopempheris* (p. 559). *Eupetrichthys* n.g. *angustipes* (p. 632). *Tripterygium annulatum* and *Congromuræna longicauda* (p. 1021).

Proc. Roy. Soc. Tasm. l.c.—On the genus *Latris*, and description of *Clinus Johnstoni*, n.sp., W. Saville Kent, F.L.S. (p. 117).

Proc. Roy. Soc. Qld. l.c.—On the occurrence of *Chanos salmones* in Moreton Bay. D. O'Connor (p. 141).

On *Polyprion prognathus* (Hapuku of N.Z.) Dr. A. Günther, Ann. and Mag. XX. 236, and on the Australian sp. of *Beryx*, ib. 240.

*Girella cyanea*, Maccl., is redescribed; and *Prionurus maculatus*, n. sp. described by Mr. Douglas-Ogilby. Proc. Zoolog. Soc. (pp. 393-395).

#### MOLLUSCA.

Contributions to Conchology, No. 1. By James C. Cox, M.D., F.L.S. (p. 1061).

Proc. R. S. Tasm. l.c.—On the Australian *Pectens* confounded with the N.Z. *P. laticostatus*. Professor Tate (p. 113). Review of the Tasmanian *Trochidæ* and some other species of molluscs (p. 193). J. Brazier, F.L.S.



Proc. Roy. Soc. S.A. l.c.—Description of some n.sp. of S.A. Marine and Freshwater Mollusca (p. 62), and Revision of the recent Lamellibranch and Palliobranch Mollusca of S. Australia (p. 76). By Professor Tate. Trochidae and other genera of S.A. J. Brazier, F.L.S. (p. 116).

Proc. Inst. N Z. l.c.—On *Architeuthis Kirkii* n.sp., a gigantic Cuttle-fish 28ft. 10in. long. C. W. Robson (p. 155). The anatomy of *Patinella radians*. J. A. Newell, B.A. (p. 157). The Mollusca of the vicinity of Auckland. T. F. Cheeseman, F.L.S. (p. 161). Land Mollusca of the Thames Gold Fields. J. Adams, B.A. (p. 177).

Land Shells from N.G. and Solomon Islands. Ann. and Mag. XIX. 416. *Voluta Güntheri* n.sp. from W. Australia, Journ. Conchol. V. 62. By Edgar Smith. (*V. Güntheri* is figured for the first time, Thes. Conch. V. Pl. 17.)

On Australian sp. of *Physa* and *Limnaea*, A. H. Cooke, F.L.S., Journal of Conchology, vol. V.

Proc. R. S. Tasm. Lc.—Note on *Palinurus Hügelii* from the Schouten Islands. The sp. probably extends also to N.Z. being, it is thought, identical with *P. tumidus*. W. Saville Kent, F.L.S. (p. 116). Fossil Crabs from P. Pliocene beds of the Yarra Estuary. F. S. Wintle, F.L.S.

#### ENTOMOLOGY.

Mr. Masters completes (Part VII.) his Catalogue of the Described Coleoptera of Australia, amounting to 7201 species (p. 31).

Mr. Macleay (Miscellanea Entomologica, No. III-V.) revises the Scaritidæ of New Holland (p. 115) describes 95 new species of Coleoptera from Cairns district, N. Queensland (pp. 213, 307), revises the Helæides, a remarkable Australian group of the Tenebrionidæ (pp. 511, 634), gives a sketch of the Entomology, etc., of King's Sound, N.W.A. Note on Scaritidæ from the Dawson R. (p. 972). Mr. Olliff describes *Ithaca anthina*, n.g. n.sp. of CEdemeridæ (p. 153), continues his revision of the Australian Staphylinidæ (p. 471), and describes *Xenica*, n.sp. (p. 976).

Mr. E. Meyrick, F.E.S., contributes (1) descriptions of new Australian Rhopalocera (p. 827) and (2) revision of the Geometridæ, with a supplement principally of W. Australian forms (p. 835), (3) descriptions of Australian Microlepidoptera Pt. XIV. (Ecophoridæ continued) (p. 929).

On a new *Pielus* from the Blue Mountains. By A. Sidney Olliff and Henry Prince (p. 1015).

Proc. R. S. Vict. l.c.—On the sound organs of *Cyclochila Australasiæ* (Green Cicada) by A. H. S. Lucas, M.A. (p. 173).

On the Trogidæ of S.A. J. G. O. Tepper, F.L.S. (p. 12) on *Ogyris Amaryllis* (p. 13) on a supposed n.sp. of Phasmidæ (p. 112); and a classified list of the Geometrina found round Balhannah, with notes on species. E. Guest (p. 126).

Inst. N.Z. l.c.—Monograph of N.Z. Noctuina, 17 genera, 6 represented by single wide ranging species, 5 endemic, with only 6 sp., 6 almost cosmopolitan.  $\frac{2}{3}$  of the endemic sp. belong to *Leucania* and *Mamestra*, just as among the Geometrina, *Larentia*

and *Notoreia* predominate. Both apparently of Chilian origin E. Meyrick, F.L.S. (p. 3). On Coccidæ, their Honeydew and the Fungus which accompanies them. W. M. Maskell, F.R.M.S., (pp. 41, 45) N.Z. 'Glowworms' the Larvæ of Gnats, and by no means coleopterous. G. V. Hudson (p. 62). On *Junonia collida* and *Desiopeia pulchella* in N.Z. The same (p. 201). On *Ixodes Mantellii*, a parasite on *Diomedea exulans*. T. W. Kirk (p. 65). On *Pasiphila lichenodes*, n.sp. A. Purdie, M.A. (p. 69). Descriptions n.sp. of spiders. A. T. Urquhart (p. 72). P. Goyen (p. 201). On a n.sp. of *Hemideina*, an Orthopterous insect W. Colenso, F.R.S. (p. 145).

The Transactions of the Entomological Society of London, 1886, contain the following articles of Australian interest :—A classification of the Pterophoridae. E. Meyrick, F.E.S. (p. 1), and Lepidoptera of South Pacific (p. 189). Descriptions of new genera and species of Lepidoptera heterocera from the Australian Region. A. G. Butler, F.L.S. (p. 381). The vol. for 1887 also contains papers on Pyralidina from Australia and South Pacific (p. 185).

Dr. Haswell has a note on the Embryology of *Termitia caespitosa* and *Eupomatus elegans* (p. 1032).

On *Bipatium Kewense* at the Cape. By R. Trimen, F.R.S. Proc. Zool. Soc. Lond., 1887 (p. 548).

On the genus *Temnocephala*, an aberrant Monogenetic Trematode. By Dr. W. A. Haswell, Sydney University, Q.J.M.S., Vol. XXVIII, p. 279 (4 sp. described).

Proc. Inst. N.Z. I.C.—On a specimen of *Acanthodrilus* sp. in which the posterior portion is double, the anal aperture being situated in the fork, T. W. Kirk (p. 64). On the work of Earthworms in N.Z. showing how rapidly they bury the surface under their accumulated castings. A. T. Urquhart (p. 119). Earthworms of N.Z. their habits, &c. W. W. Smith (p. 123).

Further contributions to the Anatomy of Earthworms, No. IV., by F. E. Beddard, F.R.S.E., with desc. of *Cryptodrilus Fletcheri*, n.sp., from Qld. Proc. Zool. Soc. Lond., 1887 (p. 544).

#### ECHINODERMATA.

Note on *Echinaster decanus*, Mull and Trosch. By Professor F. Jeffrey Bell, M.A., Corr. Mem. Soc. N.S.W. (p. 1074).

#### HYDROIDA.

Roy. Soc. Vict. I.C.—Review of the Plumulariidae, with observations on various Australian Hydroids, and corrections of, and additions to, v. Lendenfeld's papers on the Hydromedusae, L.S. N.S.W. Vols. IX and X. By W. M. Bale F.R.M.S. (p. 73).

The Australian Museum has published a "Descriptive Catalogue of the Medusae of the Australian Seas." Pt. I. Scyphomedusae. Pt. II. Hydromedusae, by R. v. Lendenfeld.

#### PORIFERA.

Sponges from the neighbourhood of Port Phillip Heads. H. J. Carter, F.R.S. Ann. and Mag. XVII. 1886 (pp. 40, 112, 431, 502) XVIII. (p. 34, 126, 271, 369, 445). On *Chondrosia spurca* n.sp. same locality, ib. XIX. (p. 286.)

## POLYZOA.

Nine species of Polyzoa, previously referred to several genera (*Lunulites* &c.) have been united by Mr. Whitelegge under *Bipora*, n.g. (p. 337.)

Roy. Soc. Vict. l.c.—P. H. Macgillivray, M.A., &c describes a large number of sp. of Polyzoa (pp. 34, 64, 180) and publishes a Catalogue of the Marine Polyzoa of Victoria, with bibliography, &c. (p. 187).

Australian Bryozoa. A. W. Waters, Ann. Mag. XX. 81, 181 253. *Lophopus Lendenfeldi* n.sp. from Parramatta R. By S. O. Ridley, F.L.S. Journ. Linn Soc. Z. XX. 61.

## INFUSORIA.

Proc. Inst. N.Z. l.c.—On Freshwater Infusoria of Wellington district. W. M. Maskell, F.R.M.S. (p. 49).

New Infusoria from N.Z. T. W. Kirk, Ann. and Mag. XIX. 620.

Typhoid and Leprosy at Little Bay Hospital (p. 203), Phosphorescent Bacteria from Seawater (pp. 331, 626), discusses the practice of Protective Inoculation for Bovine Pleuropneumonia (p. 423), and gives an account of his investigations into the Horse Murrain which broke out near the Barrier Ranges a year ago (p. 565). Mr. Maiden describes specimens of indigenous Sago and Tobacco from N. G. (p. 457). Mr. A. G. Hamilton gives a list of the indigenous Plants of the Mudgee District, their habitats and time of flowering, with numerical notes ingeniously indicating the geographical distribution of each species in the briefest possible manner; and in particular compares the Mudgee with the Sydney Flora. Dr. Haswell in his Jottings from the Biological Laboratory of Sydney University gives some notes on *Tmesipteris* and *Psilotum* (p. 1025); and we have a List of Hepaticæ collected by Mr. T. Whitelegge in New South Wales, 1884-85. By B. Carrington, M.D., F.R.S.E., and W. H. Pearson.

I also note in Vol. XX. Proc. Roy. Soc. N.S.W. from Baron v. Mueller, a description of *Ardisia poranthera*, n.sp. from N. G. (p. 43), and further additions to the Census of indigenous Plants (p. 75). From Dr. Bancroft, a note on the poisonous properties of *Daphnandra repandula*, *Archidendron Vaillantii*, *Pongamia glabra*, *Zanthoxylum veneficum*, all from the Johnstone River, N. Queensland (p. 69), and Professor Rennie describes his analysis of the sweet principle of *Smilax glycyphylla* (p. 211). In Vol. XXI. Mr. Maiden investigates the Tanning properties of a large number of sp. of *Acacia*, *Eucryphia*, *Eucalyptus*, *Angophora* and *Fusanus* (pp. 27, 82), and the Rev. H. Collie, the influence of Bush Fires in the distribution of species.

Proc. Roy. Soc. Tasm. l.c.—On *Peronospora infestans* (p. 27), and Tasmanian Mosses, being a complete description of all known species, including 43 not recorded in Fl. Tasm., together with an illustrated Key to the genera R. A. Bastow, F.L.S. (p. 38). Case of poisoning by *Rhus radicans*. F. Abbott, Supt. Bot. Gard. (p. 182). On *Eucalyptus Muellerei*, n.sp. (or more properly, acc. Baron v. Mueller), a var. of *E. urnigera*). T. B. Moore (p. 207).

Proc. Roy. Soc. Vict. Lc., also contain a record of plants from N.W. Australia by Baron von Müller, with descriptions of n.sp. of *Dodonaea*, *Gomphrena*, *Swinsonia*, *Cyperus* (p. 49). On the Fungi growing in minea, by H. T. Tisdal F.L.S., (Vol. XXIV. pp. 41, 46). The Presidential Address also contains a report by Baron von Müller on Botanical progress in Australia.

Proc. Roy. Soc. S.A. Lc.—Additions to the Extra-Tropical Flora of S. Australia (p. 57). Description of *Corchorus Elderi* n.sp. from Central Australia (p. 58) and list of plants from the Mulligan River (p. 213). By Baron v. Müller. On *Caladenia cardiochila* n.sp. Professor Tate (p. 60). Additions to the Flora of Kangaroo Island (p. 114) and Additional Lichens and Fungi of S.A. (p. 215). By J. G. O. Tepper F.L.S.

Proc. Roy. Soc. Qld. Lc.—On the decadence of Australian Forests. A. Norton, M.L.A. Note on *Caryota urens*. L. A. Bernays, F.L.S. (p. 33).

The Proceedings of the N.Z. Institute Vol. XIX. contain the

*Sida Kingii*, n.sp. *Goodenia Stephensoni* (p. 138), n.sp. *Rhododendron Lochæ*, *Agapetes Meiniana*, n.sp. *Didymocarpus Kinnsarii*, n.sp. from Mt. Bellenden Ker (p. 157). *Hypsophila Halleyana*, n.sp. from the same locality (p. 168). List of plants from Mt. Bellenden Ker (p. 169). List of Australian lichens, ib. Vol. IV. (p. 88). *Rhododendron Carringtoniæ*, n.sp. (N.G.) (p. 110). *Araucaria Cunninghami* in N.G. (p. 121). Dr. Woolls also contributes a note on Medicinal plants of N.S.W. ib. (p. 103).

During the last year Baron F. von. Müller has published a key to the Flora of Victoria, and eight decades of his promised work on the genus *Acacia*. This is entitled "*Iconography of Australian species of Acacia and Cognate Genera, &c.*" In these decades he has given figures of 80 species hitherto but imperfectly known, or only partially described. He remarks in his preface that the genus contains 300 species of well marked forms, and that it is his object to devote the volume to those native species "of which hitherto no drawings had appeared anywhere." The material for the work has been accumulating for nearly 40 years, partly from his own travels and researches, and partly through contributions from amateur botanists. No plant has been omitted of which the author does not possess full material for detailed analysis. It is needless to observe that this work is one of the greatest value, because the genus *Acacia* not only is the largest and one of the most characteristic of Australian genera, but also contains many species highly useful for economical, medicinal or ornamental purposes.

#### PALÆONTOLOGY AND GEOLOGY AND MINERALOGY.

Trilobites are the subject of three papers, by M. F. Ratte (p. 95), Professor Hutton (p. 257). Mr. J. Mitchell (p. 435). M. Ratte further writes on Australian fossils of *Salisburia* (pp. 137, 159) on the muscular impression of *Notomya* (p. 139), and on a remarkable example of Conchoidal Fracture in Torbanite. I have added a second note on *Platyceps Wilkinsonii* with description of two other specimens of probably the same Labyrinthodont



from the same locality near Gosford. With them were found a vast number of Ganoid fishes in an excellent state of preservation, forming the most important discovery as yet recorded from the Hawkesbury beds (p. 156). A description of the Volcan of Taal, Luzon, with Bibliographical, Geographical, Geological, Botanical, and Zoological notes. Rev. J. E. Tenison-Wood (p. 685).

Note on a Leucite-basalt from Central New South Wales. By Rev. J. Milne Curran, F.G.S. (p. 974).

On a supposed new species of *Nototherium*. By C. W. De Vis, M.A. (p. 1065).

Proc. Roy. Soc. N.S.W. I.c.—Papers by Prof. Liversidge. On the composition of the Thunda meteorite (p. 73). On some Rocks and Minerals from N.G. (p. 227). On Minerals—chiefly Silver—from N.S.W. (p. 231), and on the composition of Drift Pumice of Sydney, and the various Lavas from the Pacific (p. 235).

The density of N.S.W. by S. H. (p. 548).

(p. 124). Coal Seam at Compton Old Beach (p. 155). Longford Coal Basin (p. 156). List (with descriptions of n.sp.) of plants occurring at Lord's Hill, Newtown, containing many new and important forms, introducing a discussion upon the Homotaxial and Heterotaxial relations between European, Australasian and other formations, and illustrating by a diagram the reciprocal transmigration of organisms, which has led (and leads) to the puzzling variety of association in which they are combined in various regions and in various eras (p. 160). Geology of King R. &c. (p. 210). Upper Palæozoic Crinoidea of Tasmania (p. 231).

Proc. Roy. Soc. S.A. l.c.—Geology of Southern and Western parts of the Lake Eyre basin, with a list of fossils (Mesozoic) Gavin Scouler (p. 39). The Lamellibranchs (p. 142), Scaphopods (p. 190) and Pteropods (p. 194) of the Older Tertiary of Australia. By Professor Tate.

Proc. Roy. Soc. Qld. l.c.—On *Prochaerus celer*, an Australian P. Pliocene Artiodactyl, allied to *Dicotyles* (p. 42), and on a femur of (probably) *Thylacoleo* (p. 122.) C. W. de Vis, M.A. On the minerals of Kilkivan, Wide Bay. W. Fryar, Govt. Inspector of Mines (p. 129).

Proc. Inst. N.Z. l.c.—On a n.sp. of *Scaphites* from the Cretaceous of Wainui Stream, Patangata county (p. 387). A notice of a paper by von Ettingshausen on the fossil flora of the Canterbury Mountains, to appear in the Transactions K. Akad. d. W. Wien. by the late Sir Julius Haast (p. 449). (This paper forms part of the argument as to the relative ages of the Mt. Potts and Clent Hill beds, to which I referred in my address to this Society for the year 1885.) The Hot Springs of Great Barrier Island (p. 388). Professor Hutton has papers on the Geology of the Trelissick Basin (p. 392). The Gabbro of Dun Mountain (p. 412). Geology of N.E. Otago (p. 415). On the Waihao Valley (p. 430). The Waihao green-sands are also investigated by A. Mackay, Assistant Geol. (p. 434). H. Hill, B.A., (p. 441) continues the discussion as to the Geological age of the Scinde Island, to which I referred in my last address (p. 1223). A. W. Hamilton, (p. 452) in Notes on

the Geology of the Bluff district, shows that Bluff Harbour was at no remote period a fresh water lake (occupying, I suppose, a Fiord excavated by ice at a far more distant time). John Goodall, M. Inst. C.E., shows (p. 455) that the formation of the Timaru Downs, which was regarded by Haast as Loess, or Wind and Rain Formation, and by Hutton to a Marine origin, is in reality of Volcanic, consisting of stratified deposits of volcanic cinder, ash, and mud upon a substratum of basalt or lava, which is presumed to have flowed from the same or neighbouring vents. On the Tasmanian and Australian species of *Stenopora*. Professor H. A. Nicholson, Ann. and Mag. XVI. 1886 (p. 173). Baron v. Ettingshausen publishes in the Geological Magazine Aug. 1887 (p. 359), an account of the Tertiary Flora of Australia, drawn from Mr. Wilkinson's collections from New England. This paper is an abstract of contributions to the Tertiary Flora of Australia (Parts I. and II.). Denkschriften K. Akad. d. W. Wien. Also ib. (p. 363) a sketch of the N.Z. Tertiary Flora,

much authority that it must be listened to with respectful attention. I cannot however bring myself to accept it as a sufficient explanation. The other hypothesis is that of volcanic origin, implying increased heat of deep seated rocks, increased fluidity of their semi-solid magmas, upward movement of lava along faults or lines of least resistance, dislocation of the upper and more solid masses, and steam explosions of the usual type, but not attended by subsequent outpouring of lava. This is hardly the time to attempt a discussion of the question ; and I therefore simply subjoin a list of the principal reports and essays, including some which have but an indirect bearing on Tarawera, but which seem to belong as a sort of context to this theme.

Proc. N.Z. Inst. Vol. XIX.—Ascent of Ruapehu. J. Park, Geol. Surv. Dep. (p. 327). Thermal activity in R. Crater. L. Cussen (p. 374). Causes of Volcanic action. W. L. Travers (p. 331). J. Hardcastle (p. 338). Eruption of Mt. Tarawera. J. A. Pond and S. P. Smith, F.R.G.S. (p. 342). Major W. G. Mair (p. 372). Archdeacon Williams (p. 380). E. P. Dumerque (p. 382). Sir James Hector, Presidential Address (p. 462). On traces of former Volcanic Dust Showers about Napier. H. Hill, B.A. (p. 385).

Proc. Roy. Soc. Vict. Vol. XXIII.—On the official reports of the Tarawera Outbreak, with objections to some of the conclusions drawn by Hector. G. S. Griffiths (p. 117).

Proc. Linn. Soc. N.S.W.—Notes on the recent eruptions in the Taupo Zone, N.Z., by myself in our Proceedings, series 2, Vol. 1. (pp. 516, 1217).

J. Martin, F.G.S., writes on the Terraces of Rotomahana, Q.J.G.S. (Vol. XLIII. p. 165). Captain Hutton, F.G.S. On the Eruption of Mount Tarawera (ib. p. 175).

In his Presidential Address Sir J. Hector gives a brief notice of a series of soundings taken in the South Pacific by Capt. Barber, of the U.S.A. Exploring ship Enterprise, which tend to confirm Professor Hutton's views (in opposition to those of Wallace) as to the existence of a submarine plateau indicative of a former land communication between S. America and New Zealand.

The principal portion of the Address however, is devoted to full account of the Tarawera eruptions, a subject so large that have as above collected a number of different essays at its treatment under a separate head.

#### GLACIAL PERIODS IN THE SOUTH TEMPERATE ZONE.

The questions involved under this heading are now rising into such prominence that the papers dealing with them may properly like the foregoing be collected in a separate parcel. The file may commence (since we have neither space nor time for a complete bibliography) with—The Memorandum on the Correlation of the Indian and Australian Coal bearing Beds, by R. Oldham, *Geol. Mag.* On the occurrence of Glacial conditions in the Palaeozoic Era, and on the Geological Age of the Beds containing Plants of Mesozoic type in India and Australia. By W. T. T. Blanford, F.R.S. (*Q.J.G.S.* XLII. 249). *Records Geolog. Surv. Ind.* Vol. XIX. (p. 11) Waagen and Oldham.

Australia, and Professor Tate in rejoinder, in the Proc. Roy. Soc. S.A. Vol. VIII. All other papers bearing upon the Upper Palæozoic and Mesozoic rocks of the Southern Hemisphere may be regarded as portions of the evidence before us.

#### EXPLORATION OF MT. SEAVIEW.

The successful ascent of Mount Bellenden Ker, in North Queensland, by Messrs. Sayer and Froggatt, and the discovery of Himalayan forms of vegetation, such as rhododendron and cranberry, have suggested to the eager mind of Baron von Müller the much less difficult exploration of Mount Seaview, near the head of the Hastings River. It is quite possible or probable that some outliers of a Southern extension of this Asiatic Mountain Flora may reach even so far south as this somewhat isolated peak, connected perhaps in some way or other with the mountains of New Guinea and Borneo, which seem to have served as stages in the geographical progress of these Northern forms. We are informed through the kindness of Mr. Fosbery that the ascent of Mount Seaview may be attempted with good prospect of success by starting from Port Macquarie, about 60 miles distant, or from Walcha, about 80, by making arrangements with the mail contractors in either of these places.

It seems not improbable that the Macleay Range, between the Clarence and Macleay Basins, and Mount Lindsay at the western extremity of the Nandewar Range, may in like manner yield results of much interest and importance as bearing upon the geographical distribution of plants. There is indeed a large area of very high and difficult mountain country lying to the East of the Dividing Range, which is, so far as I can learn, very imperfectly known, and which deserves a close examination.

#### EMBRYOLOGY OF MONOTREMATA AND MARSUPIALIA.

We have received from Mr. W. H. Caldwell, who was so long and so indefatigably engaged in Monotreme hunting to the North, the first part of his Embryology of Monotremata and Marsupialia,

read before the Royal Society on the 17th of March last. In this, as is now pretty generally known through the medium of various scientific or quasi-scientific journals, he gives a history of previous theories and investigations and his own discoveries, which are summarized as follows—

**In Monotremata and Marsupialia—**

I.—There is a vitelline membrane which, appearing between the young ovum and follicular epithelium, persists until hatching in Monotremata, and until late uterine stages in Marsupialia.

II.—There is a second primary egg membrane secreted by the follicular epithelium shortly before the ovum leaves the ovarian follicle—the pro-albumen.

III.—The pro-albumen, by absorption of fluid in the Fallopian tube and uterus, becomes the albumen layer outside the vitelline membrane.

IV.—A secondary egg membrane—the shell membrane—is

**XL.**—The shell membrane has not been represented in its early stages, except by Barry. The "villous chorion" (non-cellular, Bischoff) is probably partly derived from a true shell membrane.

Mr. Caldwell has not, so far as I am aware, as yet made public the results of his inquiries into the Embryology of *Ceratodus*.

#### ANTARCTIC EXPLORATION.

The question of Antarctic exploration has been well agitated both in the Northern Hemisphere and in these southern latitudes. The following papers will repay perusal :—

Proc. Inst. N.Z. XIX.—C. Traill (p. 470).

Roy. Soc. Vict. XXIII.—G. S. Griffiths (p. 264).

Ib. Progress Rept. of Ant. Expl. Com. (p. 275).

Roy. Soc. Tasm.—Chas. P. Sprent, Deputy Surveyor-General (p. 141.)

New South Wales, it may be surmised or hinted in an apologetic tone, is so taken up with her century's achievements, that she has for the present ceased to look forward into the future. We have certainly displayed a manifest lack of interest in an enterprise of such importance as this, a want of energy not often chargeable against a colony, which "ab exiguis profecta initiis, eo creverit ut jam magnitudine labore sua;" for she has occupied the whole of Australia with the settlements of her daughters or her nieces, and has even been credited with an affectation of assuming for her own greater glorification the surname of the Continent.

In the waste of public funds, which no Ministry seems able to control and which I do not refrain from stigmatizing as the greatest danger to the liberty and welfare of New South Wales, it is deplorable that no outlay should be even proposed for an object so great as that of Antarctic Exploration. One fiftieth part of the money wasted during the last year on such plausible but delusive purposes as rabbit extirpation, relief of the unemployed, and Centennial



(or Centenary) Celebrations would have secured to New South Wales an enduring renown worthy of the completion of her Century, more lasting than Statues of Bronze or Parliament Houses, or these other celebrations which leave no more stable a memorial than that famous spirit did which departed "with a strong smell of sulphur and a melodious twang." The British Government decline, and very properly decline, to take part in a Joint Stock Exploration. On the same grounds we New South Walesmen also should shrink from confederate action where the terms and conditions of the confederacy are informal and indefinite. Let Victoria by herself or South Australia by herself, or Tasmania or (more logically) let New South Wales assume the inception, the contrivance, and the prosecution of this enterprise, and the other young States which we call colonies may assist. But let us have no divided councils. Let the authority be One, and let the responsibility rest upon One. We know well enough how confidently the most unfit persons will compete for the direction of an exploring expedition or any other perilous business; we

and direction of the Government of that State. It would be a ridiculous affectation to pretend that such direction would be as a matter of course perfectly wise or perfectly impartial ; but it is the best for this purpose also, since it is the best that we can arrive at for the still more important concerns of our domestic legislation and administration.

It appears then to myself that it is of good omen that the Imperial Government should decline to associate itself with any of its Australian colonies in the matter of Antarctic Exploration ; since the same reasons which deter English Statesmen from acting with us are of equal weight in showing us that this is not, like other subjects, a matter for co-operation, but one that requires the undivided and unembarrassed efforts of a single Government. I would like to add that I cannot but regard it as a false move in the game to put forward hopes of any economic or commercial advantage to be immediately derived from such an expedition. Ultimately, no doubt, all geographical discovery does always increase the area of human industry. But it may be long before this advantage is appreciated, and longer still before it becomes a recognised fact. What we are concerned with is exploration and discovery. Others will be welcome to profit by our labours.

I have selected from an overwhelming mass of material the particulars which seem to be of primary interest to members of the Society, and have necessarily omitted much which well deserves our attention. But time presses, and faculties are limited. Thanking you for the attention with which you have received these very miscellaneous, and therefore, if for no other reason, fatiguing notes, I shall conclude with the expression of a sentiment in which all will join me.

FLOREAT SOCIETAS LINNEANA !

- P.S.—Since the foregoing address was in print, I have received from Dr. Ramsay the following additional notes of papers upon Australian Natural History, viz :—

## MAMMALS.

On the Wallaby commonly known as *Lagorchestes fasciatus*. By Oldfield Thomas, F.Z.S. In P.Z.S., 1886, p. 544.

On *Phascologale virginia*, a rare Pouched Mouse from Northern Queensland. By Robert Collett, C.M.Z.S. In P.Z.S., 1886, p. 548.

Note on a Point in the Structure of *Myrmecobius*. By Frank E. Beddard, M.A., F.Z.S. In P.Z.S., 1887, part III., p. 527.

Prof. J. H. Scott and Prof. T. J. Parker. Notice of a Memoir on a Whale of the genus *Ziphius*, recently obtained near Dunedin, New Zealand. In P.Z.S., 1887, part II., p. 342.

## BIRDS.

A List of the Birds collected by Mr. C. M. Woodford in the Solomon Archipelago. By W. R. Ogilvie-Grant; in which a new

On the motion of Mr. Deane, M.A., seconded by Mr. J. H. Maiden, F.R.G.S., a vote of thanks was accorded to the President for his Address.

In the absence of the Hon. Treasurer, his report on the financial condition of the Society was postponed.

---

The following gentlemen were elected

OFFICE-BEARERS AND COUNCIL FOR 1888.

PRESIDENT:

PROFESSOR W. J. STEPHENS, M.A., F.G.S.

VICE-PRESIDENTS:

REV. J. E. TENISON-WOODS, F.L.S., F.G.S.

JAMES C. COX, M.D., F.L.S.

C. S. WILKINSON, F.L.S., F.G.S.

HONORARY SECRETARIES:

HON. WILLIAM MACLEAY, M.L.C., F.L.S.

E. P. RAMSAY, L.L.D., F.R.S.E.

HONORARY TREASURER:

HON. JAMES NORTON, M.L.C.

DIRECTOR AND LIBRARIAN:

J. J. FLETCHER, M.A., B.Sc.

COUNCIL:

JOHN BRAZIER, F.L.S., C.M.Z.S.    EDWIN HAVILAND, F.L.S.

H. DEANE, M.A., C.E.

GEORGE HURST, M.B., Ch.M.

THOMAS DIXSON, M.B., Ch.M.

J. H. MAIDEN, F.R.G.S.

W. A. HASWELL, M.A., D.Sc.

PERCEVAL R. PEDLEY.

P. N. TREBECK, J.P.

# INDEX TO VOL. II.

(SECOND SERIES.)

THE NAMES IN ITALIC ARE SYNONYMS.

	PAGE		PAGE
<i>Ablepharus Boutonii</i> ...	1029	<i>Acena ovina</i> ...	275
<i>timidus</i> ...	824	<i>sanguisorbæ</i> ...	275
<i>Abutilon</i> ...	698	<i>Acalypha indica</i> ...	785
<i>indicum</i> ...	746	<i>Acanthiza inornata</i> ...	406, 412
<i>Acacia</i> ...	7	<i>pyrrhopygia</i> ...	407
<i>amoena</i> ...	275, 308	<i>uropygialis</i> ...	407
<i>armata</i> ...	135, 274	<i>Acanthodrilus</i> ...	377, 395
<i>asparagoides</i> ...	274	<i>Acanthopis</i> ...	1020
<i>binervata</i> ...	275	<i>Acanthorhynchus dubius</i> ...	406, 412
<i>brachybotrya</i> ...	275	<i>Acanthus ilicifolius</i> ...	804
<i>coriacea</i> ...	195	<i>Acanthyses Nova Guinea</i> ...	451

# INDEX.

ii.

	PAGE		PAGE
<i>Acidalia ligataria</i> ...	842, 860	<i>Egotheles leucogaster</i>	110, 166
<i>liotis</i> ...	842, 854	<i>Erva javarica</i> ...	782
<i>lydia</i> ...	842, 851	<i>Esernoides</i> ...	46
<i>megalocentra</i>	841, 862	<i>Agapetes Meiniana</i> ...	1101
<i>neoxesta</i> ...	842, 850	<i>Agathia</i> ...	836, 899
<i>obturbata</i> ...	833	<i>asterias</i> ...	899
<i>oppilata</i> ...	917	<i>carissima</i> ...	890
<i>optivata</i> ...	843, 857	<i>Agelastica</i> ...	82
<i>orthoscia</i> ..	841, 861	<i>Ageratum conyzoides</i>	770
<i>pachydetis</i> ...	842, 847	<i>Agetinus</i> ...	40
<i>perlata</i> ...	842, 860	<i>Agonis Scortechiniana</i>	195
<i>philocosma</i> ...	842, 845	<i>Agropyron scabrum</i> ...	302
<i>posticaria</i> ...	917	<i>Agrostis Solandri</i> ...	301
<i>primaria</i> ...	917	<i>Aira caryophyllea</i> ...	1077
<i>pseliota</i> ...	842, 848	<i>Aizoon zygophylloides</i>	195
<i>recessata</i> 843, 856, 857,	[858, 917	<i>Ajuga australis</i> ...	291
<i>repletaria</i> ...	852	<i>Albizzia procera</i> ...	760
<i>rubraria</i> ... 842, 852, 1014		<i>Alcedo bengalensis</i>	979
<i>schistacearia</i> ...	971	<i>Aldrovanda vesiculosa</i>	621
<i>stipataria</i> ...	856, 857	<i>Alectoria superba</i> ...	250
<i>sublinearia</i> ...	843, 858	<i>Alesia</i> ...	90
<i>Acidaspis</i> 196, 412, 414, 437, 439		<i>Alittus</i> ...	39
<i>Brightii</i> ...	99	<i>Allecula flavicornis</i> ...	316
<i>Dormitzeri</i> 96, 97, 98, 100		<i>Allolobophora australiensis</i>	375
<i>Dufrenoyi</i> ...	98	<i>foetida</i>	375, 376
<i>Geinitziana</i> ...	96, 97	<i>profuga</i>	377
<i>Hoernesi</i> 96, 97, 98, 99		<i>turgida</i>	375, 399
<i>Leonhardi</i> 96, 97, 98, 100,	[412, 413, 414, 438	<i>Allophylus</i> ...	752
<i>minuta</i> ...	96, 97, 98	<i>Alopecurus</i> ...	305
<i>Roemeri</i> ...	96, 97, 98	<i>geniculatus</i>	301
<i>ruderalis</i> ...	97	<i>Alpheus</i> ...	1094
<i>Verneuili</i> ...	98, 437	<i>Alsomitra Muellerei</i> ...	422
<i>Acrosticum aureum</i> ...	803	<i>Alsophila australis</i> ...	9
<i>conforme</i> ...	803	<i>Leichardtiana</i>	9
<i>Actinomyces</i> ...	556	<i>Alstonia macrophylla</i>	771
<i>Actinotus helianthi</i> ...	185, 280	<i>scholaris</i> ...	771
<i>Actinus</i> ...	471, 495	<i>Alternanthera denticulata</i>	566, 782
<i>imperialis</i> ...	496	<i>triandra</i>	270
<i>Macleayi</i> ...	495	<i>Amadina Lathamii</i> ...	451
<i>Actitis empusa</i> ...	171	<i>Amaranthus oleraceus</i>	782
<i>Adamsia typica</i> ...	995	<i>spinosus</i>	782
<i>Adiantum aethiopicum</i>	303	<i>viridis</i>	782
<i>affine</i> ...	303	<i>Amaurornis moluccana</i>	446
<i>caudatum</i> ..	803	<i>Amblyornis subalaris</i>	250
<i>diaphanum</i> ...	1100	<i>Ametalla</i> ...	15
<i>hispidulum</i> ...	303	<i>Ammobium</i>	305
<i>lunulatum</i> ...	803	<i>alatum</i> ...	285
<i>Adriana tomentosa</i> ...	269	<i>Amphibolurus</i> ...	1020
<i>Ægialitis geoffroyi</i> ...	171	<i>Amphipogon strictus</i>	8
<i>nigrifrons</i> ...	171	<i>Anabas scandens</i> ...	805
<i>Ægiceras majus</i> ...	186	<i>Anacardium occidentale</i>	752
<i>Æginetia indica</i> ...	779	<i>Anamirta cocculus</i> ...	742
		<i>Ananca</i> ...	153
		<i>lateralis</i> ...	325

	PAGE		PAGE
<i>Anas castanea</i> ...	173	<i>Aristida depressa</i> ...	802
<i>Andropogon australis</i> ..	301	<i>Aristolochia tagala</i> ...	753
<i>halapensis</i> ...	301	<i>Arius thalassinus</i> ...	806
<i>montanus</i> ..	301	<i>Arsipoda</i> ..	76
<i>refractus</i> ...	301	<i>Artamus cinereus</i> ...	167
<i>schenanthus</i> ...	802	<i>leucopygialis</i> ..	167
<i>sericeus</i> ... 301,	802	<i>melanops</i> ...	405, 412
<i>Aneilema nudiflora</i> ...	799	<i>minor</i> ...	167
<i>Angianthus</i> ... ..	303	<i>Arthropodium laxum</i> ...	295
<i>strictus</i> ...	285	<i>minne</i> ...	293
<i>tomentosus</i> ...	285	<i>paniculatum</i> ...	286
<i>Angophora cordifolia</i> ...	183	<i>strictum</i> ...	286
<i>intermedia</i> ...	277	<i>Artocarpus</i> ...	726
<i>lanceolata</i> ..	348	<i>Arundo phragmites</i> ...	302
<i>Anisomeles ovata</i> ...	781	<i>Ascaris</i> sp. ...	451
<i>Anisopogon avenaceus</i> ...	8	<i>tentaculata</i> ...	451
<i>Anomalopus lentiginosus</i> ...	823	<i>Asclepias curassavica</i> ...	772
<i>Anona muricata</i> ...	741	<i>Asida</i> ...	534
<i>reticulata</i> ...	741	<i>Asperula conferta</i> ...	126
<i>squamosa</i> ...	740	<i>oligantha</i> ...	253
<i>Anous cinereus</i> ...	678	<i>Aspidiotes Ramsayi</i> ...	196
<i>Antechinus (Podabrus) Froggatti</i> 552		<i>Aspidium</i> ...	419
<i>Antennarius nummifer</i> ..	806	<i>capense</i> ...	12
<i>Anthistaria ciliata</i> ...	301, 802	<i>Aspidomorpha</i> ...	84
<i>Antiaris</i> ...	754	<i>Asplenium</i> ...	419
<i>Antilesma badius</i> ..	784	<i>aculeatum</i> ...	403

# INDEX.

iv.

	PAGE		PAGE
<i>Bacillus argenteo-phosphorescens</i> I	[628, 629, 630]	<i>Billardiera scandens</i> ...	... 265
arg.-phosph. II	628, 629, [630]	<i>Bimia</i> ...	... 141
arg.-phosph. III	... 630	<i>Bipalium</i> ..	... 247, 353, 358
arg.-phosph.-liquefaciens	[627]	Kewense	244, 245, 246, 248 [251]
<i>coli commune</i> ...	205	<i>Bipora</i> ...	... 340, 346
<i>crassus sputigenus</i> ...	143	angulopora	343, 346, 347
<i>cyaneo-phosphorescens</i>	333 [334, 628]	cancellata	... 340
lepræ ...	198	crassa	... 343
murisepticus	143	depressa	... 342
Neapolitanus	211	elegans	346, 347
phosphorescens	334	Philippinensis	341, 347
pyocyaneus	144	umbonata	345, 346, 347
smaragdino-phosphorescens	[332, 333, 334]	<i>Bixa orellana</i> ...	... 744
typhi abdominalis	203, 205 [208, 211]	<i>Blandfordia nobilis</i> ...	186, 348
<i>Backhousia myrtifolia</i> ..	185	<i>Blatta</i> ..	... 1014
<i>Bacterium phosphorescens</i>	331, 332	<i>Blechnum cartilagineum</i>	... 304
<i>Bæckea</i> ..	7	laevigatum	... 304
brevifolia	185	orientale	... 803
crenulata	105	<i>Blechnum Brownei</i> ...	... 780
Cunninghamii	276, 306	<i>Blepharostoma palmatum</i>	... 1049
diosmifolia	105	<i>Blumea balsamifera</i> ...	... 770
linifolia	1077	lacera	... 770
<i>Baiera</i> ...	137, 160, 161	laciniata	... 770
dichotoma	138	manilensis	... 770
palmata	137, 159	<i>Boerhaavia</i> ...	... 305
<i>Balantiopsis diplophylla</i>	1053	diffusa	271, 782
<i>Bambusa arundinacea</i> ...	801	<i>Bombyx</i> ...	... 175
<i>Banksia</i> ...	6	<i>Boronia parviflora</i> ...	... 135
integrifolia	11	pinnata	6, 135, 267, 1077
marginata	283	serrulata	... 135
<i>Burita destructor</i> ...	167	<i>Bossiaea</i> ...	... 175
<i>Barringtonia acutangula</i> ...	764	heterophylla...	... 272
<i>Bartlingia gracilis</i> ...	298	microphylla	... 105
<i>Basella alba</i> ...	782	prostrata	135, 272
rubra	782	<i>Brachychiton populneum</i>	... 268
<i>Bauera rubioides</i> ...	7	<i>Brachycome calocarpa</i>	... 284
<i>Bauhinia</i> sp. ...	762	ciliaris	... 284
<i>Bazzania anisostoma</i> ...	1047	decipiens	284, 1077
Novæ-Hollandiæ	1047	diversifolia	... 283
<i>Begonia Sharpeana</i> ...	420, 421, 422	graminea	... 284
sinuata	421	marginata	.. 284
<i>Belideus ariel</i> ...	981	melanocarpa	.. 284
<i>Belone</i> ...	1020	pachyptera	... 284
<i>Belonostomus</i> ...	156	scapigera	... 284
<i>Bembidium</i> ...	1019	stricta..	... 284
<i>Bertya rosmarinifolia</i>	268	<i>Brachyloma</i> ...	... 7
<i>Beryx</i> ...	1093	daphnoides	... 292
<i>Bidens pilosa</i> ...	771	<i>Brachysoma simile</i> ...	556, 1020
		<i>Brachyurophis australis</i>	... 174
		<i>Breynia cernua</i> ...	... 784
		oblongifolia	... 105
		<i>Bridelia stipularis</i> ...	... 783



	PAGE		PAGE
<i>Bronteus</i> ...	99	<i>Cassia sericeus</i> ...	506, 507, 508
<i>longispinifex</i> 435, 439, 440		<i>velutinus</i> ...	506
<i>Partschii</i> ...	438	<i>Cakile maritima</i> ..	106
<i>Bucharia</i> ...	18	<i>Caladenia</i> ..	5
<i>Buccinum acutinodeum</i> ...	995	<i>alba</i> ...	106, 296
<i>Brasilianum</i> ..	999	<i>arenaria</i> ...	296, 305
<i>lucigatum</i> ...	990	<i>caerulea</i> ...	296
<i>Buddleia asiatica</i> ...	774	<i>cardiochila</i> ...	1100
<i>neemda</i> ...	774	<i>carnea</i> ...	296
<i>Bulbine bulbosa</i> ..	297	<i>clavigera</i> ...	296
<i>Bulimina Larreyi</i> ...	1062	<i>cucullata</i> ...	296
<i>Bulinus bicoloratus</i> ..	809	<i>dilatata</i> ..	296
<i>cumingii</i> ...	810	<i>filamentosa</i> ..	296
<i>elongatulus</i> ...	810	<i>Patersoni</i> ...	136
<i>fulgetrum</i> ...	809	<i>testacea</i> ...	106
<i>leali</i> ..	810	<i>Calamoherpe australis</i>	110
<i>lignarius</i> ...	909	<i>longirostris</i> 110, 108	
<i>Macfarlandi</i> ...	1063	<i>Caleana major</i> ...	106
<i>MacFarlandi</i> ...	1063	<i>Caleya minor</i> ..	296
<i>nimbosus</i> ...	909	<i>Calichrous bimaculatus</i>	806
<i>panayensis</i> ...	810	<i>Callicarpa bicolor</i> ..	780
<i>pythogasta</i> ..	809	<i>longifolia</i> ...	780
<i>Bulla ampulla</i> ...	1001	<i>Callicoma serratifolia</i>	185
<i>Burchardia umbellata</i>	106	<i>Calligenia</i> ...	921
<i>Bursaria spinosa</i> .	265, 565	<i>melitaula</i> ...	921
<i>Buteo</i> ...	15	<i>Calliscallia</i> ...	117

# INDEX.

vi.

	PAGE		PAGE
<i>Calceola</i> var. <i>nitida</i> ...	443	<i>Carenoscaphus atronitens</i> ...	120
<i>Calotis</i> <i>anthemoides</i> ...	195	<i>coracinus</i> ...	120
<i>cuneifolia</i> ...	284	<i>devastator</i> ...	120
<i>lappulacea</i> ...	284	<i>gawlerensis</i> ...	120
<i>Calotropis gigantea</i> ...	772	<i>intermedius</i> 120, 972	
<i>Calycotrix tetragona</i> ...	276	<i>lucidus</i> 120, 131, 972	
<i>Calymene</i> ...	99	<i>nigerrimus</i> ...	120
<i>Blumenbachii</i> 412, 413		<i>oblongus</i> ...	120
<i>Calypogeia unguiculata</i> ...	1053	<i>quadripunctatus</i> ...	120
<i>Calyptrorhynchus macrorhynchus</i> 170		<i>scaritoides</i> ...	120
<i>naso</i> ...	170	<i>striato-punctatus</i> ...	120
<i>stellatus</i> ...	170	<i>subquadratus</i> ...	120
<i>Campophaga leucomela</i> ...	971	<i>sumptuosus</i> ...	120
<i>leucomelena</i> ...	971	<i>Carenum</i> 115, 116, 117, 120, 121	
<i>tricolor</i> ...	167	<i>affine</i> ...	121
<i>Canavalia</i> ...	698	<i>anthracinum</i> ...	121
<i>ensiformis</i> ...	757	<i>Batesi</i> ...	121
<i>obtusifolia</i> ...	756	<i>Bonellii</i> ...	121
<i>Candollea (Stylidium) graminifolia</i> [287		<i>Briabanense</i> ...	121
<i>linearis</i> 287		<i>carbonarium</i> ...	121
<i>laricifolia</i> 287		<i>Castlenau</i> ...	121, 972
<i>Canscora diffusa</i> ...	192	<i>convexum</i> ...	121
<i>Capparis horrida</i> ...	743	<i>cyanipenne</i> ...	121
<i>micrantha</i> ...	743	<i>De Visii</i> ...	121
<i>Capicum annuum</i> ...	778	<i>ebeninum</i> ...	121
<i>frutescens</i> ...	778	<i>elongatum</i> ...	116, 119
<i>minimum</i> ...	778	<i>frontale</i> ...	121
<i>Capulus subrufus</i> ...	999	<i>ianthinum</i> ...	121
<i>Capura pinnata</i> ...	752	<i>inoditum</i> ...	121
<i>Cerax leptolepis</i> ...	805	<i>interruptum</i> 121, 972, 973	
<i>nigripes</i> ...	805	<i>Kingii</i> ...	121
<i>sp.</i> ...	992	<i>laevigatum</i> ...	121
<i>Cercharias brachyurus</i> ...	164	<i>laevipenne</i> ...	121
<i>maorurus</i> 163, 1024		<i>laterale</i> ...	121
<i>Cardamine hirsuta</i> ...	264	<i>marginatum</i> ...	121
<i>Cardiospermum halicacabum</i> ...	752	<i>megacephalum</i> ...	117
<i>Carenidium</i> 116, 117, 118, 127, 128, [129		<i>Murrumbidgeae</i> ...	121
<i>Chaudourii</i> 118, 125, 127		<i>nitescens</i> ...	121
<i>Damelu</i> ...	118, 125	<i>obacurum</i> ...	121
<i>Darlingense</i> 118, 124, 125		<i>obsoletum</i> ...	972
<i>gagatum</i> ...	118, 126	<i>occultum</i> ...	121, 972
<i>Kreuslerae</i> ...	118	<i>opacum</i> ...	121
<i>lacustre</i> ...	118	<i>ovipenne</i> ...	121
<i>mucronatum</i> ...	118	<i>perplexum</i> ...	121
<i>sapphirinum</i> ...	118	<i>planipenne</i> ...	121
<i>septentrionale</i> 118, 126		<i>politalum</i> ...	121
<i>Spaldingi</i> ...	118	<i>politum</i> ...	121
<i>tropicale</i> 116, 127		<i>propinquum</i> ...	122
<i>Carenoscaphus</i> 117, 120		<i>puncticolle</i> ...	121
<i>ambiguus</i> ...	120	<i>punctulatum</i> ...	121
<i>angustipennis</i> ...	120	<i>purpureo-marginatum</i> 121, [132	
		<i>pusillum</i> ...	121
		<i>rectangulare</i> ...	122

	PAGE		PAGE
<i>Carenum scitulum</i> ...	121	<i>Centrolepis fascicularis</i> ...	282, 289
<i>sexpunctatum</i> ...	121	<i>Centropus ateralbus</i> ...	444
<i>simile</i> ..	121	<i>melanurus</i> ..	170
<i>Spencei</i> ...	122	<i>phasianus</i> ...	170
<i>striato-punctatum</i> ...	121	<i>Cephalodesmus cornatus</i> ...	220
<i>subcostatum</i> ...	121	<i>Cephalozia Leitgebiana</i> ...	1049
<i>submetallicum</i> ...	121	<i>setulosa</i> ...	1049
<i>subplanatum</i> ..	121	<i>Cerumbyx Fichtelii</i> ...	1013
<i>subporcatulum</i> ..	121	<i>Ceratella fusca</i> ..	198
<i>Terræ-reginæ</i> ...	121	<i>Ceratodus</i> ...	156, 1100
<i>tinctilatum</i> ...	116	<i>Ceratogone obionoides</i> ...	195
<i>transversicollis</i> ..	122	<i>Ceratopetalum apetalum</i> 10,	185
<i>triste</i> ...	121	<i>gummiiferum</i> ..	185
<i>tuberculatum</i> ...	116	<i>Ceratophyllum</i> ..	305
<i>viridi-marginatum</i> ...	121	<i>demersum</i> ...	276
<i>viridipenne</i> ..	121	<i>Cereaium simplex</i> ...	1011
<i>Westwoodii</i> ..	121	<i>Ceyx solitarius</i> ...	979
<i>Carex bengalensis</i> ...	300	<i>Chaetocnema</i> ..	79
<i>inversa</i> ..	300	<i>Chalcites basalis</i> ..	170
<i>paniculata</i> ...	300	<i>minutillius</i> ...	170
<i>pseudo-cyperus</i> ..	300	<i>oculans</i> ...	170
<i>Carica papaya</i> ..	786	<i>Chalcolampra</i> ..	49
<i>Carpophaga latrans</i> ..	445	<i>Chalcomela</i> ...	47
<i>Carpophagus</i> ..	14	<i>Chanos salmonensis</i> ...	1093
<i>Caryota urens</i> ...	1100	<i>Charagia</i> 457, 468, 681,	979
<i>Caryota ulata</i> ...	1100	<i>Charaxes Jupiter</i> ...	979

# INDEX.

viii.

	PAGE		PAGE
<i>Chiroplatys</i> ...	1002	<i>Cisticola</i> <i>ruficeps</i> ...	168
<i>inconspicuus</i> ...	229	<i>Cladium</i> <i>mariscus</i> ...	800
<i>latipes</i> ...	1005	<i>microstachyum</i> ...	300
<i>lissus</i> ..	1004	<i>teretifolium</i> ...	300
<i>Chislenius</i> <i>peregrinus</i> ..	1002	<i>Cladophorus</i> <i>miniatus</i> ...	235
<i>Chlamydocheilus</i> <i>jubata</i> ...	178	<i>poeticus</i> ...	234
<i>Chlamydodera</i> <i>nuchalis</i> ...	189	<i>testaceicollis</i> ..	234
<i>Chlamydosaurus</i> <i>Kingii</i> ..	1020	<i>Clarias</i> <i>dussumieri</i> ...	806
<i>Chloris</i> <i>barbata</i> ...	802	<i>Claytonia</i> <i>Australasica</i> ...	982
<i>truncata</i> ..	302, 802	<i>Cleithrolepis</i> ..	145, 156
<i>Chlorochroma</i> ..	870	<i>Clematis</i> <i>aristata</i> ...	284
<i>caulmaria</i> ...	886	<i>microphylla</i> ...	284
<i>caenaria</i> ...	881, 882	<i>Cleome</i> ...	743
<i>citrolimbaria</i> ...	879	<i>Cleora</i> <i>hypochromaria</i> ...	909
<i>congenita</i> ...	885	<i>Cleorina</i> ...	45
<i>decussata</i> ...	887	<i>Cleptor</i> ...	45
<i>dichlorurus</i> ..	884	<i>Clerodendron</i> <i>infortunatum</i> ...	781
<i>externa</i> ...	885	<i>Clanthus</i> <i>Dampieri</i> ...	1075
<i>inchoata</i> ...	881	<i>Clidnotus</i> ...	47
<i>intermita</i> ...	887	<i>Climacteris</i> <i>melanura</i> ..	169
<i>neptunus</i> ...	881	<i>Clinus</i> <i>Johnstoni</i> ...	1083
<i>saturaria</i> ..	895	<i>Clitoria</i> <i>ternatea</i> ..	758
<i>vertumnaria</i> ...	885	<i>Clivina</i> ...	133, 1019
<i>vulnerata</i> ...	886	<i>Cnidon</i> ...	183
<i>Chlorodes</i> ..	870	<i>Coccinella</i> ...	89
<i>mirandaria</i> ..	892	<i>Cocculus</i> <i>indicus</i> ...	742, 764
<i>Cherops</i> <i>Macleayi</i> ..	241	<i>Cochlostyla</i> <i>Hindei</i> ...	1063
<i>Cholipus</i> <i>atroviridis</i> ..	311	<i>Coenobius</i> ...	26
<i>Chondrosia</i> <i>apurea</i> ...	1097	<i>Coesyra</i> ..	948
<i>Choretrum</i> <i>Candollei</i> ..	7, 281	<i>Colaspis</i> ..	40, 1013
<i>laterifolium</i> ..	281	<i>Colaspoides</i> ..	45
<i>Chrysoena</i> <i>lateovirens</i> ...	443	<i>Colasposoma</i> ..	43
<i>Chrysomela</i> ..	46	<i>Colletia</i> ..	305
<i>Chrysopa</i> ...	1014	<i>pubescens</i> ...	280
<i>Chrysophanus</i> ...	827	<i>Collocalia</i> <i>Philippina</i> ..	451
<i>Chrysopogon</i> <i>aciculatus</i> ...	802	<i>spodiopygia</i> ...	451
<i>gryllus</i> ...	802	<i>sp.</i> ..	979
<i>Cicada</i> ...	1014	<i>Collyriocinclia</i> <i>brunnea</i> ..	167
<i>Cicindela</i> <i>Froggatti</i> ..	213	<i>rufigaster</i> ...	167
<i>Cilibe</i> ..	518, 520	<i>Colonia</i> ...	483
<i>granulata</i> ..	535	<i>regalis</i> ...	471, 494
<i>silphoides</i> ..	538, 539	<i>Colpodes</i> <i>muconatus</i> ..	218
<i>striato-punctata</i> ...	546	<i>Columbella</i> <i>nirosa</i> ...	997
<i>tristis</i> ..	536	<i>pardalina</i> ...	997
<i>Westwoodii</i> ...	516	<i>pertusa</i> ...	997
<i>Cincloramphus</i> <i>cantillans</i> ...	168	<i>sp.</i> ...	998
<i>cruralis</i> ...	168	<i>versicolor</i> ...	997
<i>Cinna</i> <i>ovata</i> ...	8	<i>Columbellina</i> <i>Tyleri</i> ...	997
<i>Cinnyris</i> <i>coriaria</i> ...	444	<i>Comatula</i> <i>sp.</i> ...	452
<i>Circus</i> <i>aequilis</i> ..	165	<i>Comesperma</i> <i>defoliatum</i> ...	565
<i>gouldii</i> ...	165	<i>ericinum</i> ...	268
<i>jardini</i> ...	165	<i>retusum</i> ...	135
<i>Cissampelos</i> <i>paraisa</i> ..	742	<i>sphaerocarpum</i> ...	266
<i>Cisticola</i> <i>lineo-capilla</i> (?) ...	168	<i>volabile</i> ...	105

	PAGE		PAGE
<i>Comibaena</i> ...	870	<i>Coris cingulum</i> ..	1024
<i>calcinata</i> ..	897	<i>trimaculata</i> ...	992
<i>felicitata</i> ...	892	<i>variegata</i> ...	1024
<i>metaspila</i> ...	895	<i>Correa speciosa</i> ...	267
<i>partita</i> ...	892	var. <i>canensis</i> ...	103
<i>pieroides</i> ..	897	<i>Corylophus</i> ...	94
<i>Cominella acutinodosa</i>	995	<i>Corysanthes Hamiltonii</i>	294, 308
<i>costata</i> ..	995	<i>Cossyphus bellia</i> ...	561
<i>glandiforme</i>	995	<i>Cotula australis</i> ..	296
<i>lurida</i> ...	995	<i>Cræticus nigrogularis</i>	167
<i>Tritoniformis</i>	995	<i>picatus</i> ...	167
<i>Zealandica</i> ...	995	<i>robustus</i> ...	167
<i>Comnelyna bengalensis</i>	799	<i>torquatus</i> ...	167
<i>cyanea</i> ...	166, 299	<i>Crantzia</i> ..	305
<i>nudiflora</i> ...	799	<i>lineata</i> ...	281
<i>Comostola</i> ..	898, 869	<i>Craspedia Riches</i> ...	285
<i>perlepidaria</i> ..	869	<i>Cratæva nurvala</i> ...	743
<i>Conescharrellina</i> ...	340	<i>Crenophilus</i> ...	471, 491, 494
<i>cunica</i> ...	337, 343	<i>erythrocephalus</i>	492, 493
<i>depressa</i> ...	337, 342		[1003
<i>Congromuræna habenata</i>	1022	<i>maxillosus</i> ...	492
<i>longicauda</i> ..	1021	<i>oculatus</i> ...	493
<i>Conopterum</i> 116, 117, 118, 127, 128,	[129	<i>Crepidodera</i> ...	77
<i>amabile</i> ..	118	<i>Crepis</i> ...	305
<i>Barnardi</i> 118, 129, 972		<i>Japonica</i> ...	286
<i>hirsutum</i> 118, 128		<i>Crioceris</i> .	16
		<i>Cremus</i> ...	437

# INDEX.

X.

	PAGE		PAGE
<i>Cyanotis axillaris</i> ...	799	<i>Datura alba</i> ...	779
<i>cristata</i> ...	799	<i>Daucus</i> ...	305
<i>Cyclochila Australasiae</i> ...	1095	<i>brachiatus</i> ...	281, 566
<i>Cyclodus nigro-luteus</i> ...	174	<i>Daulis</i> ...	89
<i>sp.</i> ...	1020	<i>Davallia</i> ...	419
<i>Cyclomela</i> ...	47	<i>ciliata</i> ..	803
<i>Cyclonoda</i> ...	46	<i>dubia</i> ...	303
<i>Cydippa</i> ...	83	<i>pyxidata</i> ...	303
<i>Cymbidium suave</i> ..	186, 293	<i>vestita</i> ...	803
<i>Cymbonotus Lawsonianus</i> ...	286	<i>Daviesia</i> ...	7
<i>Cynodon Dactylon</i> ...	302, 802	<i>corymbosa</i> ...	135, 272
<i>Cynoglossum australe</i> ..	290	<i>genistifolia</i> ...	272
<i>suaveolens</i> ...	290	<i>latifolia</i> ...	272
<i>Cynosurus cristatus</i> ...	9	<i>squarrosa</i> ...	272
<i>Cyperus carinatus</i> ...	299	<i>ulicina</i> ...	105, 272
<i>concinus</i> ..	299	<i>Decialma striatopunctata</i> ...	310, 311
<i>congestus</i> ...	299	<i>viridipennis</i> ...	311
<i>difformis</i> ...	299	<i>Deeringia celosioides</i> ...	782
<i>digitatus</i> ...	422	<i>Deiopeia</i> ...	926
<i>exaltatus</i> ...	300, 800	<i>pulchella</i> 926, 1014, 1096	
<i>flavicomus</i> ...	800	<i>Delima sarmentosa</i> ...	740
<i>fulvus</i> ...	299	<i>Delma frazeri</i> ...	825, 1020
<i>globosus</i> ...	800	<i>plebeia</i> ...	826
<i>gracilis</i> ...	299	<i>tincta</i> ...	824
<i>lucidus</i> ...	300	<i>Demetrias</i> ...	218
<i>ornatus</i> ...	299	<i>brachioderus</i> ...	218
<i>pumilus</i> ...	800	<i>rufescens</i> ...	217
<i>pygmæus</i> ...	800	<i>Demiegretta sacra</i> ...	445
<i>rotundatus</i> ...	800	<i>Dendrobium pugioniforme</i> ...	11
<i>vaginatus</i> ...	299	<i>speciosum</i> 259, 293	
<i>Cyphaspis Bowningensis</i> 438, 439,		<i>striolatum</i> ...	8
	[440	<i>teretifolium</i> 11, 293	
<i>Cyphodera</i> ...	30	<i>Dendrocoryna vagans</i> ...	173
<i>Cyprea</i> ...	998	<i>Dendrophis sp.</i> ...	196
<i>Cyrtasia cristata</i> ...	928	<i>Dentella repens</i> ...	768
<i>egregiella</i> ...	928	<i>Dermorhysis</i> ...	41
<i>Cyrena</i> ...	717	<i>Desmodium brachypodium</i> 273, 565	
<i>sub-orbicularis</i> ...	807	<i>gangeticum</i> ...	755
<i>Czekanowskia</i> ...	161	<i>latifolium</i> ...	756
		<i>parvifolium</i> ...	756
<i>Dacelo cervina</i> ...	166	<i>polycarpum</i> ...	756
<i>Dactylis glomerata</i> ...	9	<i>pulchellum</i> ...	756
<i>Damasonium australe</i> ...	298	<i>rhytidophyllum</i> 274, 566	
<i>Dampiera Brownii</i> ...	7	<i>varians</i> ...	185, 273
<i>stricta</i> ..	7, 287	<i>Deyeuxia</i> ...	305
<i>Danais chrysippus</i> 1019, 1076, 1077		<i>Diadema bolina</i> ...	1013, 1014
<i>Petilia</i> 1019, 1076, 1077		<i>Diandichus</i> ...	39
<i>plexippus</i> ...	412, 1013	<i>Dianella cærulea</i> ...	8, 297, 348
<i>Danthonia nervosa</i> ...	302	<i>lævis</i> ...	186
<i>penicillata</i> ...	302	<i>longifolia</i> ...	297
<i>semiannularis</i> ...	8	<i>revoluta</i> ...	136, 297
<i>Daphnaudra repandula</i> ...	1099	<i>Diaphanops</i> ...	14
<i>Darwinia</i> ...	7	<i>Diaphoromerus iripennis</i> ...	1003
<i>Dasyurus Geoffroyi</i> ...	981	<i>Diaphromorpha</i> ...	17

	PAGE		PAGE
<i>Dibolia</i> ... ..	80	<i>Dodonaea lobulata</i> ...	209, 206
<i>Dicaeum hirundinaceum</i> ...	169	<i>triquetra</i> ...	209, 206
<i>Dichelaehne crinita</i> ...	301	<i>viscosa</i> ...	209
<i>sciurea</i> ...	301	<i>Dolichandrone rheedii</i> ...	750
<i>Dichondra repens</i> ...	288	<i>Dolichoplanea</i> ...	353
<i>Dicksonia antarctica</i> ...	9, 10	<i>Doliocarpus</i> ...	740
<i>Dicropteris longifolia</i> ...	138	<i>Donacicola pectoralis</i> ...	108
<i>Dicteniophorus ramifer</i> ...	1005	<i>Doryphora sassafras</i> ...	11
<i>Didelphys</i> ...	451	<i>Drachophyllum secundum</i> ...	292
<i>Didiscus incisus</i> ...	280	<i>Drepane punctata</i> ...	806
<i>Didymocarpus Kinnearii</i> ...	1101	<i>Drillia Beraudiana</i> ...	996
<i>Didymogaster</i> ...	614	<i>Dromaeus Novae-Hollandiae</i> ...	377
<i>Diemenia</i> sp. ...	1020	<i>Drosera auriculata</i> ...	286
<i>superciliosa</i> ...	556	<i>binata</i> ...	286, 287
<i>Digaster</i> ...	614	<i>peltata</i> ...	206
<i>Dillenia</i> ...	740	<i>spathulata</i> ...	367
<i>Dillwynia</i> ...	7	<i>Drymoglossum piloselloides</i> ...	803
<i>ericifolia</i> ...	272	<i>Dubulais</i> ...	13
<i>juniperina</i> ...	272	<i>Dules (Ctenolates) auratus</i> ...	151
<i>Dioclus</i> ...	472	<i>nitens</i> ...	4
<i>divisus</i> ...	473	<i>Dyschirius</i> ...	133
<i>Octavii</i> ...	472	<i>Dyathaeta anomala</i> ...	1012
<i>Diomedea exulans</i> ...	1096	<i>naevia</i> ...	1011
<i>Dioscorea hirsuta</i> ...	799	<i>Echiduophaga ambulans</i> ...	109
<i>pentaphylla</i> ...	799	<i>Echinaster decanus</i> ...	1074, 1075
<i>sativa</i> ...	798		

# INDEX.

xii.

	PAGE		PAGE
<i>Encara floccosum</i> ...	517, 518	<i>Eranthemum bicolor</i> ...	780
<i>Lacordairei</i> ...	517, 519	<i>variabile</i> ...	586
<i>submaculatum</i> 516, 517, 519		<i>Erechtites arguta</i> ...	286
<i>Westwoodii</i> ... 515, 516, 517		<i>Eremophila Sturtii</i> ...	1075
<i>Encephalartos spiralis</i> ...	292	<i>Eria Kingii</i> ...	422
<i>Encephalus</i> ...	515	<i>Erianthus fulvus</i> ...	361
<i>gibbosus</i> ...	516	<i>Erigeron pappochromus</i> ...	982
<i>submaculatus</i> 516, 517		<i>Eriochilus autumnalis</i> ...	293
<i>Enchocrates</i> ...	929	<i>Eriochloa annulata</i> ...	300
<i>phaedryntis</i> ...	929	<i>Erionispa</i> ...	85
<i>picrophylla</i> ...	930	<i>Eriostemon hispidulus</i> ...	348
<i>sorentis</i> ..	929	<i>myoporoides</i> ...	135
<i>Encrinurus</i> ...	99, 437	<i>obovalis</i> ...	7
<i>Enhalus Koenigii</i> ...	787	<i>Erodium cygnorum</i> ...	267
<i>Enicodes</i> ...	1002	<i>Eromene vetustella</i> ...	923
<i>Fichteli</i> ..	1001, 1013	<i>Eryngium rostratum</i> ...	280
<i>Montrouzieri</i> ...	1013	<i>Erythraea australis</i> 186, 192, 288	
<i>Enneamera</i> ...	81	<i>Erythrichthys nitidus</i> ...	621
<i>Entada scandens</i> ...	761	<i>Erythrogonyx cinctus</i> ...	171
<i>Entomis</i> ...	414	<i>Erythrura</i> ...	979
<i>Entomophila albogularis</i> ...	169	<i>Eschara umbonata</i> ...	337, 345
<i>rufogularis</i> ...	169	<i>Estrilda annulosa</i> ..	110, 168
<i>Eochrois</i> ...	932	<i>bichenovii</i> ...	110, 168
<i>archescia</i> ...	932	<i>castanotis</i> ...	168
<i>dejunctella</i> .	932	<i>phaeton</i> ...	168
<i>Eomystis</i> ...	932	<i>ruficauda</i> ...	168
<i>rhodopis</i> ...	932	<i>Ethulia conyzoides</i> ...	141, 195
<i>Epacris</i> ...	7	<i>Eucalyptus</i> 841, 878, 904, 929, 934,	
<i>apiculata</i> ...	292	[935, 937, 938, 961	
<i>coriacea</i> ..	982	<i>albens</i> ...	278
<i>crassifolia</i> ...	292	<i>amygdalina</i> ...	10
<i>heteronema</i> ...	982	<i>Baileyana</i> ...	195
<i>Ephthianura aurifrons</i> ...	110	<i>botryoides</i> ...	279
<i>crocea</i> ...	110, 168	<i>capitella</i> ...	6, 10
<i>Epidesmia tricolor</i> ...	452	<i>capitellata</i> ...	277
<i>Epilachna</i> ...	93	<i>dealbata</i> ...	279
<i>Epilissus globulus</i> ...	222	<i>eugenoides</i> 10, 277	
<i>Epilobium tetragonum</i> ...	276	<i>globulus</i> 259, 260, 278, 306	
<i>Epimachus Macleayanae</i> ...	239	<i>goniocalyx</i> ..	278
<i>magnus</i> ...	240	<i>haemastoma</i> 6, 277	
<i>Epinephile Joanna</i> ...	141	<i>hemiphloia</i> ...	278
<i>Epipristis</i> ... 836, 916, 918		<i>largiflorens</i> ...	278
<i>oxycyma</i> ...	916	<i>leucoxylon</i> ...	277
<i>rufonigraria</i> ...	916	<i>macrorhyncha</i> 10, 277	
<i>Episcapha Froggatti</i> ...	327	<i>meliolora</i> ...	277
<i>Episcaphula</i> ...	88	<i>obliqua</i> ...	279
<i>bifasciata</i> ..	327	<i>pauciflora</i> ...	6
<i>gigas</i> ...	326	<i>piperita</i> ...	6
<i>Eragrostis Brownii</i> ...	302	<i>polyanthema</i> ...	277
<i>leptostachya</i> ...	302	<i>populifolia</i> ...	278
<i>pilosa</i> ...	802	<i>rostrata</i> ...	279
<i>plumosa</i> ...	802	<i>siderophloia</i> ...	278
<i>setifolia</i> ...	302	<i>Sieberiana</i> ...	6
<i>tenella</i> ...	302, 802	<i>stellulata</i> ...	277



	PAGE		PAGE
<i>Encalyptus stricta</i> ...	...	<i>Eulechria habrophanes</i> ...	950
<i>Stuartiana</i> ...	278	<i>halmopeda</i> ...	957
<i>tereticornis</i> ...	279, 468	<i>heliocoma</i> ...	948
<i>terminalis</i> ...	978	<i>heliadora</i> ...	948
<i>viminalis</i> ...	10, 278, 1077	<i>hemicarpa</i> ...	954
<i>Euchaetis</i> ...	937, 940	<i>homochalca</i> ...	963
<i>endoleuca</i> ...	938, 941	<i>homoteles</i> ...	947
<i>habrocoma</i> ...	940	<i>homoxesta</i> ...	957
<i>holoclera</i> ...	940, 941	<i>hyperchlora</i> ...	962
<i>ioaspila</i> ...	938, 941	<i>ichneuta</i> ...	944
<i>metallota</i> ...	940	<i>irenaea</i> ...	962
<i>poliarcha</i> ...	939, 941	<i>malacoptera</i> ...	948
<i>rhizobola</i> ...	937, 940	<i>melesella</i> ...	947
<i>Eucrostis</i> ...	836, 867, 918	<i>menodes</i> ...	945
<i>argocrana</i> ...	867	<i>mesophragma</i> ...	950
<i>io centra</i> ...	867, 868	<i>mochlastis</i> ...	960
<i>latilunata</i> ...	867, 868	<i>ophthalmias</i> ...	940
<i>leucomerata</i> ...	889	<i>pelodora</i> ...	944
<i>perleptaria</i> ...	889	<i>phaeuceptra</i> ...	964
<i>Eudrilus</i> ...	381	<i>phaeostephes</i> ...	956
<i>dubius</i> ...	378	<i>puellaria</i> ...	948
<i>Eudynamis cyanocephala</i> ...	170, 354	<i>schalidota</i> ...	953
<i>gimlensis</i> ...	170, 354	<i>siccella</i> ...	961
<i>Eugenia jambolana</i> ...	763	<i>thrincotis</i> ...	963
<i>Jambosa</i> ...	144	<i>tropica</i> ...	951
<i>Sm thii</i> ...	11, 346	<i>vaethucrossa</i> ...	956
<i>sp.</i> ...	563	<i>vaethustephana</i> ...	957

xiv.

<b>Euryscaphus Waterhousei</b> ...	123	<b>Fimbristylis acuminata</b> ...	800
<b>Euryspa</b> ...	84	<i>communis</i> ...	300
<b>Eurystomus pacificus</b> ...	166	<i>nutans</i> ...	800
<b>Eustrephus Brownii</b> ...	297, 566	<b>Flabellopora</b> ...	340
<b>Euthyrrhinus medietabundus</b> ...	1008	<i>elegans</i> ...	337, 346
<b>Eutoma</b> 116, 117, 119, 120, 128		<b>Flacourtia sepiaria</b> ...	745
<i>bipunctatum</i> ...	119, 972	<b>Flemingia strobilifera</b> ...	757
<i>brevipenne</i> ...	120, 131	<b>Flindersia</b> ...	970
<i>cavipenne</i> ...	119	<b>Frenela Muelleri</b> ...	8
<i>cupripenne</i> ...	119	<b>Frullania cinnamomea</b> ...	1035
<i>Digglesi</i> ...	120	<i>deplanata</i> ...	1035, 1037
<i>episcopale</i> ...	119, 972	<i>diplota</i> ...	1038
<i>filiforme</i> ...	119	<i>falciloba</i> ...	1036, 1037
<i>glaberrimum</i> ...	119	<i>monocera</i> ...	1037
<i>laeve</i> ...	119	<i>pentapleura</i> ...	1037
<i>Loddonense</i> ...	119	<i>probosciphora</i> ...	1037
<i>magnificum</i> ...	120, 130, 972	<i>spinifera</i> ...	1037
<i>Mastersi</i> ...	119	<i>squarrulosa</i> ...	1037
<i>Newmani</i> ...	119	<b>Fulica australis</b> ...	172
<i>punctatum</i> ..	120	<b>Farina textilis</b> ...	556
<i>punctipenne</i> ...	119		
<i>punctulatum</i> 130, 131, 972		<b>Galeola cassythoides</b> ...	136
<i>purpuratum</i> ...	119	<b>Galerucella</b> ...	83
<i>splendidum</i> ...	119	<b>Galinsoga parviflora</b> ...	9
<i>subrugosulum</i> ...	119	<b>Galium Gaudichaudi</b> ...	186
<i>substriatulum</i> ...	119	<i>umbrosum</i> ...	283
<i>tinctilatum</i> ...	119	<b>Gallinago australis</b> ...	172
<i>undulatum</i> ...	119	<b>Gallinula ruficrissa</b> ...	446
<i>violaceum</i> ...	119	<b>Gastrodia sesamoides</b> ...	8, 136
<b>Euxolus interruptus</b> ...	270	<b>Geijera salicifolia</b> ...	267, 306
<i>macrocarpus</i> ...	270	<b>Geitoneura</b> ...	976
<i>Mitchellii</i> ..	270	<b>Geitonoplesium cymosum</b> ...	8, 186
<b>Exocarpus cupressiformis</b> 281, 565, [897		<b>Gelohelidon macrotaraxa</b> ...	173
<i>stricta</i> ...	281, 306	<b>Geloptera</b> ...	41
<b>Exometoea</b> ...	833	<b>Genoplesium Baueri</b> ...	141
<i>nycteris</i> ...	833	<b>Gentiana aquatica</b> ..	192
		<i>quadrifaria</i> ...	191, 192
		<i>saxosa</i> ...	192, 982
<b>Fagraea</b> ...	419	<i>squarrosa</i> ...	192
<b>Falco frontatus</b> ...	165	<b>Geometra albicosta</b> ...	888
<i>lunulatus</i> ...	165	<i>boisduvalaria</i> ...	892
<i>melanogenys</i> ...	166	<i>latilineata</i> ...	868
<b>Favosites Gothlandica</b> ...	109	<i>semicrocea</i> ...	887
<b>Ficus altimeraloo</b> ...	787	<i>submissaria</i> ...	882
<i>aspera</i> ...	787	<b>Geopelia humeralis</b> ...	171
<i>hirta</i> ...	787	<i>placida</i> ...	171
<i>hispida</i> ...	786	<b>Geoplana</b> 350, 352, 353, 354, 357, [358, 361	
<i>radiata</i> ...	787	<i>cærulea</i> 353, 354, 361, 363, [370, 371, 374	
<i>rubiginosa</i> ...	269	<i>Moseleyi</i> ...	353
<i>wassa</i> ...	787	<i>munda</i> ...	369, 374
<b>Fidonia aculaliaria</b> ...	952	<i>ornata</i> ...	368, 374
<i>rufonigraria</i> ...	916		
<b>Fieldia australis</b> ...	10, 11		

virgata ...  
 viridis ...  
 Whartoni ...  
 Geoscaptus ..  
 Geranium carolinianum  
     dissectum...  
 Geronticus spinicollis  
 Gerygone albogularis  
     insularis ...  
     Thorpei ...  
 Gigadema atrum ...  
 Ginkgo ...  
     biloba ...  
 Ginkgophyllum ...  
 Girella cyanea ...  
 Glareola grallaria ...  
 Gleichenia circinata .  
     dichotoma  
     flabellata  
     flagellaria  
 Glicidia maculata ...  
 Glossodia major ...  
     minor ..  
 Glossogyne tenuifolia  
 Glossopteris ...  
 Glossostigma Drummond  
 Glottis gillotoides ...  
 Glycine clandestina .  
 Gmelina asiatica .  
 Gnaphalium Japonicum  
     luteo-albu  
     purpureum  
 Gnapholodes uliginosum  
 Gnathoxys ...  
 Gobius ...  
 Gompholobium ...  
     latifolium  
     minus

# INDEX.

xvi.

	PAGE		PAGE
<b>Haloragis</b> <i>ceratophylla</i> ...	276	<b>Heliocausta</b> <i>acmaea</i> ...	936, 937
<i>elata</i> ...	276	<i>crocoxantha</i> ...	934
<i>heterophylla</i> ...	276	<i>hemiteles</i> ... ..	935
<i>micrantha</i> ...	185, 276	<i>mimica</i> ... ..	934
<i>teucrioides</i> ...	185, 276	<i>paralyrgis</i> ... ..	935
<b>Haltica</b> ... ..	78	<i>parthenopa</i> ... ..	936
<b>Halyzia</b> ... ..	89	<i>phylacopis</i> ... ..	935, 937
<b>Hapalotis</b> <i>Boweri</i> ... ..	981	<i>protoxantha</i> ... ..	936
<b>Hedraianthera</b> <i>porphyropetala</i> ...	195	<i>rhodoxantha</i> ... ..	933
<b>Hedycarya</b> <i>angustifolia</i> ... ..	11	<i>sarcophanes</i> ... ..	936
<b>Hedyotis</b> <i>paniculata</i> ... ..	768	<i>severa</i> ... ..	934
<b>Helæus</b> 513, 514, 550, 635, 651, [654, 675		<i>triphaenatella</i> ... ..	935
<i>Brêmei</i> ... ..	517	<b>Heliomystis</b> ... ..	835, 900, 918
<i>Brownii</i> ... ..	639	<i>electrica</i> ... ..	900
<i>castor</i> ... ..	646	<b>Heliotropium</b> <i>indicum</i> ... ..	775
<i>colossus</i> 636, 640, 643		<b>Helipterum</b> <i>anthemoides</i> ... ..	285
<i>consularis</i> ... ..	645	<i>dimorpholepis</i> ... ..	285
<i>Derbyensis</i> ... ..	648	<i>incanum</i> ... ..	285
<i>echidna</i> ... ..	650	<i>laeve</i> ... ..	195
<i>echinatus</i> ... ..	649	<b>Helix</b> <i>Busbyi</i> ... ..	1061
<i>falcatus</i> ... ..	646	<i>Chapmani</i> ... ..	1063
<i>Haagii</i> ... ..	648	<i>Falconari</i> ... ..	1075
<i>Hopei</i> ... ..	647	<i>Gurgustii</i> ... ..	1062
<i>interioris</i> ... ..	639	<i>Kooringsensis</i> ... ..	1062
<i>intermedius</i> ... ..	637, 640	<i>Maconelli</i> ... ..	1075
<i>Kirbyi</i> ... ..	641	<i>maxima</i> ... ..	809
<i>Macleayi</i> ... ..	643	<i>ptychomphala</i> ... ..	1062
<i>marginellus</i> ... ..	661	<i>Sophieæ</i> ... ..	1061
<i>Mastersi</i> ... ..	644	<i>Yulensis</i> ... ..	1063
<i>moniliferus</i> ... ..	642	<b>Helluosoma</b> <i>aterrimus</i> ... ..	217
<i>ovatus</i> ... ..	650, 651	<i>cyanipenne</i> ... ..	216
<i>pallidus</i> ... ..	640	<i>latipenne</i> ... ..	217
<i>perforatus</i> 641, 642, 643, 657		<i>viridipenne</i> ... ..	216
<i>Peronii</i> 644, 646, 648, 650		<b>Hemarthria</b> <i>compressa</i> ... ..	301
<i>piceus</i> ... ..	524	<b>Hemipodius</b> <i>velox</i> ... ..	171
<i>princeps</i> ... ..	637, 640	<b>Hemirhamphus</b> <i>intermedius</i> ... ..	628
<i>simplex</i> ... ..	665	<i>melanochir</i> ... ..	629
<i>Spencii</i> ... ..	642	<b>Heritiera</b> <i>littoralis</i> ... ..	749
<i>Spinolaæ</i> ... ..	657	<b>Herodias</b> <i>alba</i> ... ..	172
<i>squamosus</i> ... ..	647, 648	<i>intermedia</i> ... ..	172
<i>tarsalis</i> ... ..	666	<i>melanopus</i> ... ..	172
<i>testudineus</i> ... ..	655, 675	<i>plumiferus</i> ... ..	172
<i>tuberculatus</i> ... ..	651	<b>Herpestis</b> <i>monnieriæ</i> ... ..	565
<b>Heleocharis</b> <i>atricha</i> ... ..	300	<b>Hesperus</b> ... ..	506
<i>variegata</i> ... ..	800	<i>australis</i> ... ..	510, 511
<b>Helicarion</b> <i>Sophieæ</i> ... ..	1061	<i>hæmorrhoidalis</i> ... ..	508, 509, [510
<b>Helichrysum</b> <i>apiculatum</i> ... ..	285	<i>mirabilis</i> ... ..	508, 512
<i>diosmifolium</i> ... ..	106	<i>pacificus</i> ... ..	509
<i>elatum</i> ... ..	8, 285	<i>Pulleinei</i> ... ..	512
<i>lucidum</i> ... ..	285	<i>rufipennis</i> ... ..	509
<i>semipapposum</i> ... ..	285	<i>semirufus</i> ... ..	511
<b>Helicia</b> <i>Sayeriana</i> ... ..	1100	<b>Hestiochora</b> ... ..	926
<b>Heliocausta</b> ... ..	933, 937, 944	<i>rufiventris</i> ... ..	926

*maculatus* ..  
*mundus* ...  
*pectoralis* ...  
*peroni* ...  
*rhomboidalis*  
*rostralis* ...  
*tetradactylus*  
*vertebralis*  
*Hiatricula inornata* ..  
*Hibbertia* ...  
*acicularis* ...  
*dentata* ...  
*diffusa* ...  
*fasciculata* ..  
*linearis* ...  
*nitida* ..  
*pedunculata*  
*saligna* ..  
*stricta* ...  
*Hibiscus* ..  
*caeculentus* ..  
*rosa-sinensis*  
*surattensis* ..  
*tiliaceus* ..  
*trionum* ...  
*Hierackidea berigora* ..  
*occidentalis*  
*orientalis*  
*Himantopus leucocephalus*  
*Himulia ambigua* ...  
*domina* ..  
*elegantula* ...  
*maindroni* ...  
*richardsoni*  
*tenuis* ...  
*tigrina* ..  
*Hipponyx antiquata*..  
*foliacea*

# INDEX.

xviii.

	PAGE		PAGE
<i>Hydrocotyle comocarpa</i> ...	1100	<i>Indigofera</i> ...	7
<i>hirta</i> ...	195	<i>australis</i> ..	273, 1077
<i>javanica</i> ...	195	<i>brevidentata</i> ...	273
<i>laxiflora</i> ...	280	<i>galegoides</i> ...	755
<i>vulgaris</i> ...	545	<i>tinctoria</i> ...	784
<i>Hymenanthera Banksii</i> ...	285	<i>Inga dulcis</i> ...	781
<i>Hymenophyllum javanicum</i> ...	802	<i>lanceolata</i> ...	781
<i>polyanthus</i> ...	802	<i>Iodia</i> 836, 870, 891, 905, 918	
<i>Tunbridgensis</i> ...	303	<i>albicosta</i> ...	872, 888
<i>Hyperna albalis</i> ...	923	<i>argocnemis</i> ...	872, 883
<i>Hypericum Japonicum</i> ...	185, 286	<i>asemanta</i> ...	873, 879
<i>Hypoceras</i> ...	92	<i>beryllina</i> ...	872, 877
<i>Hypochaeris glabra</i> ...	9	<i>bipunctifera</i> ...	866
<i>Hypochroma</i> 836, 904, 918		<i>boisduvalaria</i> ...	871, 892
<i>acanthina</i> ...	905, 910	<i>buprestaria</i> ...	871, 890
<i>cetraria</i> ...	912	<i>byrsopsis</i> ...	873, 898
<i>crenaria</i> ...	905, 915	<i>cadmaria</i> ...	871, 886
<i>deteriorata</i> ...	905, 913	<i>carenaria</i> ...	872, 881
<i>distenta</i> ...	915	<i>centrophylla</i> ..	873, 880
<i>emiliaria</i> 905, 911, 912		<i>citrolimbaria</i> ...	873, 879
<i>erebata</i> ...	905, 914	<i>crossata</i> ...	871, 894
<i>erebusata</i> ...	914	<i>dichloraria</i> ...	873, 884
<i>hypochromaria</i> 905, 909		<i>exoterica</i> ...	871, 891
<i>metarhodata</i> 905, 908		<i>externa</i> ...	873, 885
<i>muscosaria</i> 905, 912		<i>fugitivaria</i> ...	872, 876
<i>nyssata</i> ...	917	<i>gratiosata</i> ..	872, 876
<i>occultaria</i> ...	903	<i>halochlora</i> ...	873, 878
<i>paratorna</i> 905, 906		<i>hypsithrona</i> ...	873, 874
<i>paulinaria</i> ...	915	<i>inchoata</i> ...	872, 881
<i>percomptaria</i> 905, 907		<i>inaperata</i> ...	871, 873, 895
<i>quamata</i> ...	912	<i>intacta</i> ..	876
<i>sublimbata</i> ...	915	<i>iosticta</i> ...	871, 893
<i>Wilsoni</i> ...	905, 906	<i>leucochorda</i> ...	873, 875
<i>Hypoderes</i> ...	40	<i>leucomerata</i> ...	871, 889
<i>Hypoxis hygrometrica</i> ...	106, 296	<i>meandraria</i> ..	873, 874
<i>Hypsophila Halleyana</i> ...	1101	<i>melocrossa</i> ...	872, 879
<i>Hyptis brevipes</i> ...	781	<i>metaspila</i> ..	871, 895
<i>capitata</i> ...	781	<i>monocyma</i> ..	873, 883
<i>suaveolens</i> ...	781	<i>neptunus</i> ..	873, 881
<i>Ianthenas vitiensis</i> ...	446	<i>obliquissima</i> ...	876
<i>Ianthina fragilis</i> ..	999	<i>ochthaula</i> ..	873, 877
<i>Ibacus</i> ...	968	<i>ocyptera</i> ..	872, 887
<i>Ichnocarpus frutescens</i> ...	772	<i>oxycentra</i> ...	872, 888
<i>ovatifolius</i> ...	772	<i>partita</i> ...	871, 892
<i>velutinus</i> ...	772	<i>pieiroides</i> ...	871, 873, 897
<i>Idaea agnes</i> ..	860	<i>pyropa</i> ..	872, 878
<i>farinalis</i> ...	917	<i>rhodocosma</i> ...	871, 889
<i>innocens</i> ...	843	<i>saturataria</i> ...	871, 895
<i>jessica</i> ...	850	<i>semicrocea</i> ...	872, 887
<i>lydia</i> ...	850	<i>stereota</i> ...	873, 875
<i>Idmones interjuncta</i> ...	250	<i>submissaria</i> ...	872, 882
<i>Milneana</i> ..	250	<i>vertumnaria</i> ...	873, 885
		<i>Ionidium floribundum</i> ...	8



muticum...  
**Isodon glabricollis** ..  
**Isopogon** ... ..  
    anemonifolius ..  
    petiolaris ..  
**Isotachis** ... ..  
    armata ..  
    grandis ..  
    Gunniana 14  
    haematodes ..  
    indica ...  
    intortifolia ...  
    Lindigiana ...  
    Lyallii ...  
    madida ...  
    multiceps ...  
    serrulata 10  
    subtrifida ...  
    subtrifidus ...  
**Isotoma axillaris** ...  
    fluvialis ...  
**Ithaca** ... ..  
    anthina ..  
**Ixodes Mantelli** ..  
**Jacksonia Clarkii** ...  
    capulifera  
    densiflora  
    Forrestii  
    hakeoides  
    nematoclada  
    odontoclada  
    pteroclada  
    racemosa  
    rhadinoclada  
    scoparia .  
    Sternbergiana  
    thesioides  
    vernicoea

# INDEX.

XX.

	PAGE		PAGE
<i>Lagenophora Billardieri</i> ...	186	<i>Lepidotarsa chrysopoca</i> ..	930
<i>eolenogyne</i> ...	283	<i>iriodes</i> ...	930
<i>Lagerstroemia flos-reginæ</i> ...	765	<i>leucodetia</i> ...	930, 931
<i>Lagris alba villosa</i> ...	316, 317	<i>protea</i> ...	930, 931
<i>purpurei, ennis</i> ...	317	<i>Lepidozia albula</i> ...	1044
<i>rufocephala</i> ...	316	<i>capillaris</i> ...	1045, 1046
<i>tomentosa</i> ...	317	<i>capilligera</i> ...	1046
<i>Lalage terat</i> ...	442	<i>centipes</i> ...	1045
<i>tricolor</i> ...	442, 971	<i>Gottscheana</i> ...	1044
<i>Lambertia</i> ...	7	<i>gracillima</i> ...	1045
<i>formosa</i> ...	136	<i>laevifolia</i> ..	1044
<i>Lamellaria Wilsoni</i> ...	1094	<i>longiscypha</i> ...	1047
<i>Lamprina</i> ...	1002	<i>procera</i> ...	1046
<i>sericea</i> ...	1004	<i>quadrifida</i> ...	1044, 1046
<i>Lamprolina</i> ...	51	<i>setacea</i> ...	1047
<i>Languria</i> ...	87	<i>tenax</i> ...	1048
<i>australis</i> ...	326	<i>ulotrix</i> ...	1044
<i>Lappago racemosa</i> ...	801	<i>verticillata</i> ...	1046
<i>Lasiodactylus calvus</i> ...	1003	<i>Wallichiana</i> ...	422
<i>stellidotoidea</i> ...	1004	<i>Lepistemon reniformis</i> ...	776
<i>Lasiopetalum parviflorum</i> ...	135	<i>Leptacinus</i> ...	473
<i>rufum</i> ...	135	<i>batychnus</i> ...	476
<i>Lasioptera vastatrix</i> ...	1072	<i>cyano-pennis</i> ...	477
<i>Lates</i> ...	182	<i>filum</i> ..	477
<i>calcarifer</i> ...	181	<i>linearis</i> ...	476
<i>colonorum</i> ..	181, 182	<i>luridipennis</i> ...	474
<i>Latris hecateia</i> ...	979	<i>Novæ-Hollandiæ</i> ...	475
<i>Laturus</i> ...	994	<i>parumpunctatus</i> ...	474
<i>Noumeensis</i> ...	994	<i>picticornis</i> ...	476
<i>Laxmannia gracilis</i> ...	136	<i>Leptocephalus tænia</i> ...	414
<i>Leca</i> ...	698	<i>Leptochloa chinensis</i> ...	802
<i>sambucina</i> ...	751	<i>Leptomeria acida</i> ...	7, 281, 566
<i>Leeuwenhoekia dubia</i> ...	287	<i>Leptorrhynchos elongatus</i> ...	285
<i>Leioscyphus chiloscyphoides</i> ..	1053	<i>aquamatus</i> ...	285
<i>Lefseunea flava</i> ...	1039, 1040	<i>Leptospermum</i> ...	7, 153, 931, 933
<i>gracillima</i> ..	1040	<i>attenuatum</i> ...	105
<i>lineata</i> ...	1038	<i>laevigatum</i> ...	276
<i>mimosa</i> ...	1038	<i>lanigerum</i> ...	135
<i>rufescens</i> ...	1038	<i>parviflorum</i> ...	105
<i>serpyllifolia</i> ..	1039	<i>scoparium</i> ...	185, 276
<i>sublobata</i> ..	1039	<i>stellatum</i> ...	135
<i>Lema</i> ...	16	<i>Lespedeza cuneata</i> ...	274
<i>Lembidium</i> ...	1048	<i>Lethrus acnea</i> ...	1004
<i>dendroides</i> ...	1047, 1048	<i>Leucena glauca</i> ...	761
<i>nutans</i> ...	1048	<i>Leucas aspera</i> ...	782
<i>ventrosum</i> ...	1048	<i>linifolia</i> ...	782
<i>Lemna oligorrhiza</i> ...	298	<i>Leucispa</i> ...	84
<i>polyrhiza</i> ...	298	<i>Leucopogon</i> ...	7
<i>Lepidina turbata</i> ...	1004	<i>Richei</i> ...	136
<i>Lepidota Frogeatti</i> ..	227	<i>virgatus</i> ...	565
<i>Lepidium ruderales</i> ...	265	<i>Lichas hirsutus</i> ..	95, 101
<i>Lepidotarsa</i> ...	930	<i>palmata</i> ...	95, 96, 100, 101
<i>alphitella</i> ...	930	<i>var. sinuata</i> ...	95, 101
		<i>sinuata</i> ...	95





*glauca*  
*purpurea*  
*simplicis*  
*Lobivanellus mile*  
*Locusta*  
*Loligo* sp.  
*Lomaria Capensis*  
*discolor*  
*Patersoni*  
*Lomatia* ...  
*ilicifolia*  
*silaifolia*  
*Longitarsus*  
*Lophocolea hetero*  
*Lopholaimus autar*  
*Lophophaps ferrug*  
*lenoog*  
*Lophopus Lendenf*  
*Loranthus celastroi*  
*exocarp*  
*linophyll*  
*villo*  
*longiflori*  
*pendulus*  
*Lotus australis*  
*Loxopleurus*  
*Ludius ramifer*  
*Luffa acutangula*  
*Lumnitzera racemosa*  
*Lunulites*  
*Lunulites angulopora*  
*cancellata* ?  
*crassa* .  
*incisa* .  
*Philippinen*  
*Lutianus johnii* ..  
*Luzula campestris* ..  
*Lycena* ... ..  
*Lycenastium* ..

# INDEX.

xxii.

	PAGE		PAGE
<b>Melobasis</b> ... ..	141, 1002	<b>Momordica cochinchinensis</b> ...	767
<i>purpurascens</i> ...	1005	<b>Monaroha canescens</b> ...	1075
<b>Melochia corchorifolia</b> ...	749	<i>Lessoni</i> ...	443
<b>Melopsittacus undulatus</b> 590, 593, 595		<b>Monocentrum</b> ...	116, 117
<b>Melothria indica</b> ...	768	<i>grandiceps</i> ...	117, 972
<b>Menippus</b> ... ..	88	<i>longiceps</i> ...	117, 972
<b>Mentha australis</b> ...	291	<i>megacephalum</i> ...	117
<i>laxiflora</i> ...	291	<b>Monochirus</b> ...	85
<i>saturejoides</i> ...	291	<b>Monocrepidius striatus</b> ...	1005
<b>Merodontus calcaratus</b> ...	221	<b>Monogramma dareocarpa</b> ...	422
<i>squalidus</i> ...	221	<b>Monolepta</b> ...	88
<b>Merops ornatus</b> ...	166, 441	<b>Monotaxis linifolia</b> ...	7
<b>Mesembryanthemum æquilaterale</b>	[185	<b>Monotoca</b> ...	7
	170	<i>scoparia</i> ...	106
<b>Mesocalius palliolatus</b> ...	170	<b>Mordella elongatula</b> ...	320
<b>Metisopus</b> ... ..	1002	<i>flavicans</i> ...	319
<i>purpureipennis</i> ...	1006	<i>hamatilis</i> ...	318
<b>Metoponcus</b> ... ..	477	<i>nigrans</i> ...	319
<i>cyaneipennis</i> ...	477	<i>notabilis</i> ..	317
<i>enervus</i> ...	478	<i>obscuripennis</i> ...	319
<b>Metriorhynchus centralis</b> ...	230	<i>ovalisticta</i> ...	318
<i>elongatus</i> ...	229	<i>pulverulenta</i> ...	317
<i>foliatus</i> 230, 231		<i>subvittata</i> ...	320
<i>hirtipes</i> ...	231	<i>undosa</i> ...	318
<i>serraticornis</i> 231		<b>Morinda citrifolia</b> ...	769
<b>Metrosideros glomulifera</b> ...	279	<i>jasminoides</i> ...	186
<b>Metzgeria furcata</b> ...	1056	<b>Moringa pterygosperma</b> ...	754
<b>Michelia champaca</b> ...	740	<b>Moschosina polystachyum</b> ...	781
<b>Micrococcus cinnabareus</b> ...	575	<b>Mucuna</b> ... ..	419, 698
<i>tetragenus</i> ...	144	<i>atro-purpurea</i> ...	756
<i>viticulosus</i> ...	211	<i>gigantea</i> ...	756
<b>Microlæna stipoides</b> ...	8	<b>Muehlenbeckia gracillima</b> ...	135
<b>Microtis parviflora</b> ...	294	<b>Mugil cephalotus</b> ...	805
<i>porrifolia</i> 8, 136, 294		<i>cunnesius</i> ...	805
<b>Mittochrista simulans</b> ...	921	<b>Munia melaena</b> ..	443
<b>Milvus affinis</b> ...	166	<b>Muntinga calabura</b> ...	750
<b>Mimosa pudica</b> ...	762	<b>Murænesox cinereus</b> ...	806
<b>Mimulus gracilis</b> ...	289	<b>Murex Angasi</b> ...	993
<i>prostratus</i> ...	289	<i>eos</i> ...	993
<i>repens</i> ..	289, 565	<i>margriticola</i> ...	994
<b>Minuria Cunninghamii</b> ...	284	<i>ricinus</i> ...	994
<i>leptophylla</i> ...	284	<i>unulata</i> ...	994
<b>Mirafra horsfieldii</b> ...	168	<b>Murrayia</b> ... ..	181, 184
<b>Mirbelia</b> ... ..	7	<i>guentheri</i> ...	181
<i>reticulata</i> ...	105	<b>Mus Burtoni</b> ...	551, 553
<b>Mitocera</b> ... ..	35	<i>Tompsonii</i> ...	447
<b>Mitra festa</b> ... ..	997	<b>Musa abaca</b> ...	796, 798
<i>sp.</i> ...	997	<i>banksii</i> ...	796
<b>Mitrasacme pilosa</b> ...	8	<i>fitzalani</i> ...	796
<b>Mocoa delicata</b> ...	820	<i>hillii</i> ...	796
<i>guichenoti</i> ...	821	<i>paradisiaca</i> 790, 792, 796	
<i>mustelina</i> ...	820	<i>sapientum</i> 788, 790, 791, 792, 793	
<i>spectabilis</i> ...	819	<i>seminifera agrestis</i> ...	792
<b>Momordica balsamina</b> ...	767	<i>seminifera domestica</i> ...	792

latum ...  
 montanum  
 tenuifolium  
**Myosotis australis** ...  
     suaveolens  
**Myriogyne minuta** ...  
**Myristica** ...  
**Myrsine variabilis** ...  
**Mysolius** ...  
     aurichalcus  
     chalcopterus  
**Myxus elongatus** ..  
**Myzantha lutea** ...  
**Myzomela pectoralis**..  
**Nacerdes** ..  
**Najas major** ..  
**Nanina Sophia** ...  
**Naravelia zeylanica**...  
**Nardoa Gilberti** ...  
**Nasiterna finschii** ..  
**Nassa paupers** ...  
     rufocincta ...  
     spirata  
     versicolor  
**Nasturtium terrestre**  
**Natica areolata** ..  
     marochiensis ...  
     sagittata  
**Nautinus** ..  
**Nautilus spirula** ..  
**Neda** ..  
**Nemoria gratiosa** ..  
**Neocarenum**  
     cylindripenne  
     elongatum  
     Mastersi  
     retusum  
     rugosulum

# INDEX.

# INDEX.

	PAGE		PAGE
<i>Edura mouha</i> ..	611	<i>Palustris flabellicornis</i> ...	324
<i>tryoni</i> ..	511, 512	<i>nigripennis</i> ...	324
<i>Oenothera Lamarckiana</i> ..	144	<i>Palinurus Edwardsii</i> ..	1094
<i>Ogyris Amaryllis</i> ..	1085	<i>Hugelia</i> ..	1085
<i>Orates</i> ..	979	<i>Lalandii</i> ..	1084
<i>Oides</i> ... ..	51	<i>tumidus</i> ..	1085
<i>Olae stricta</i> ..	135, 281	<i>Paludina</i> ..	717, 807
<i>Oligorus Macquariensis</i> ..	981	<i>tricarinata</i> ..	808
<i>Mitcheli</i> ..	961	<i>Panax fruticosum</i> ..	422
<i>Omphacomeria acerba</i> ..	7, 281	<i>sambucifolia</i> ..	280
<i>Onthophagus emarginatus</i> ..	224	<i>Pandanus bages</i> ..	799
<i>Proggatti</i> ..	223	<i>odoratissimus</i> ..	799
<i>furciceps</i> ..	223	<i>Pandion leucocephalus</i> ..	166
<i>lobocollis</i> ..	224	<i>Panicum atro-virens</i> ..	300
<i>parallelicornis</i> ..	223	<i>crus-galli</i> ...	300, 801
<i>Walteri</i> ..	223	<i>distachyum</i> ..	801
<i>Onychium auratum</i> ..	803	<i>flavidum</i> ..	300, 801
<i>Onychoprion fuliginosus</i> ..	675	<i>leucophæum</i> ..	300
<i>Opercularia diphylla</i> ..	283	<i>repens</i> ...	801
<i>hispida</i> ..	283	<i>sanguinale</i> ..	300, 801
<i>Ophiocephalus striatus</i> ..	805	<i>Papaver aculeatum</i> ...	263
<i>Ophioglossum vulgatum</i> ..	303	<i>Papilio achanta</i> ...	976
<i>Ophioscincus frontalis</i> ..	823	<i>Aganemnon</i> ..	979
<i>Opisthognathus inornatus</i> ..	561	<i>amphiaras</i> ..	1001, 1014
<i>Orehipoda foetida</i> ...	771	<i>Codrus</i> ...	979
<i>Oreus</i> ..	91	<i>Erskinei</i> ...	979
<i>Oricopia</i> ... ..	1012	<i>Ilioneus</i> ...	412
<i>Ornithoptera D'Urvilleana</i> ..	979	<i>Polydorus</i> ...	979
<i>Victoriæ</i> ..	979	<i>Sthenelus</i> ..	1019
<i>Oroxylum</i> ... ..	695	<i>Ulysses</i> ...	979
<i>indicum</i> ..	780	<i>Pappophorum commune</i> ..	301
<i>Orthoceras</i> ... ..	438	<i>Paracadmus</i> ...	30
<i>strictum</i> ..	7, 565	<i>Paracephala</i> ...	35
<i>Oryza sativa</i> ... ..	801	<i>Paradisornis Rudolphi</i> ..	250
<i>Osmunda</i> ..	305	<i>Paralepta</i> ...	52
<i>barbara</i> ...	303	<i>Paraphanes</i> ..	308
<i>Otolithus argenteus</i> ...	805	<i>nitidus</i> ...	300
<i>Ottelia ovalifolia</i> ...	296	<i>Paraphanta Busbyi</i> ..	1061
<i>Oxalis corniculata</i> ..	267	<i>Parialotus uropygialis</i> ..	167
<i>Oxycephala</i> ... ..	85	<i>Parietaria debilis</i> ..	269
<i>Oxylobium</i> ... ..	175	<i>Parina polylepis</i> ...	992
<i>cordifolium</i> ..	135	<i>Paropsis</i> ..	56
<i>ellipticum</i> ..	272	<i>Paspipila hchenodes</i> ..	1006
<i>trilobatum</i> ..	272	<i>Paspalum distichum</i> ..	300, 801
<i>Pachycephala falcata</i> ..	167	<i>Pasiflora brachystephanes</i> ..	195
<i>Gilbertii</i> ..	103	<i>Patella</i> ... ..	243
<i>gutturalis</i> ..	970	<i>antiquata</i> ...	999
<i>icteroides</i> ..	442	<i>Pateronia glabrata</i> ..	106
<i>Pachydomus</i> sp. ...	982	<i>sericea</i> ..	296
<i>Pachyrhizus angulatus</i> ..	757	<i>Patinella radians</i> ...	1094
<i>Pædaria foetida</i> ..	769	<i>Pavonia hastata</i> ...	268
<i>tomentosa</i> ..	769	<i>Pecten laticostatus</i> ...	1093
<i>Palæstrida bicolor</i> ...	326	<i>Pelargonium australe</i> ..	267
<i>concolor</i> ...	323, 324	<i>Pelocotomoides aureotincta</i> ..	321

	PAGE		PAGE
<i>Pelocotomoides marmoratus</i> ...	321	<i>Phalangista lemuroides</i> ..	1073
<i>serraticornis</i> ..	322	<i>vulpina</i> .	142, 143
<i>Pentarthrum Millingtoni</i> ...	1009	<i>sp.</i> ...	981, 1073
<i>Nepeanlanum</i> ...	1009	<i>Phaneroptera</i> ...	1014
<i>Peperomia exigua</i> ...	783	<i>Phaps chalcoptera</i> ...	171
<i>Peragale leucura</i> ...	1091	<i>histrionica</i> ...	171
<i>Perameles auratus</i> ...	551, 981	<i>Pharus</i> ...	93
<i>sp.</i> ..	981	<i>Phascolarctos</i> ...	1108
<i>Perca</i> ..	182	<i>Phaseolus calcaratus</i> ...	757
<i>Percalates</i> ...	181, 182	<i>trinervius</i> ...	757
<i>Perichæta</i> ..	377, 395	<i>vulgaris</i> ...	757
<i>australis</i> ...	391	<i>Philadelphus coronarius</i> ...	759
<i>austriana</i> 399, 400, 401	401	<i>Philemon argenteiceps</i> ..	169
<i>Bakeri</i> ...	616	<i>cockerelli</i> ...	444
<i>Barronensis</i> ...	394	<i>notata</i> ..	169
<i>canaliculata</i> 377, 391, 397	397	<i>occidentalis</i> ...	676
<i>Coxii</i> ..	613	<i>Philonthus</i> .. 495, 497, 498, 505	
<i>dorsalis</i> ...	618	<i>australis</i> ...	310
<i>exigua</i> ..	387, 389	<i>harmorrhoidalis</i> ...	508
<i>var. Murrayana</i> ...	389	<i>pacificus</i> ..	504
<i>fecunda</i> ...	401, 620	<i>sericeus</i> ...	507
<i>Hamiltoni</i> ...	399	<i>Philoscaphus</i> ... 116, 117, 123	
<i>monticola</i> .	390	<i>Barnardi</i> ..	973
<i>perigrina</i> ...	377	<i>carinatus</i> 123, 973	
<i>Raymondiana</i> ...	398	<i>costalis</i> .	123
<i>Stirlingi</i> ...	395	<i>lateralis</i> ..	123

INDEX.

xxvi.

	PAGE		PAGE
<i>Pieris java</i> ...	1013, 1014	<i>Pleurotoma</i> ...	998
<i>Teutonia</i> ...	1019	<i>Plotosus angularis</i> ...	806
<i>Piezorhynchus chalybæoccephalus</i> ...	442	<i>Plotus novæ-hollandiæ</i> ...	173
<i>Pileopsis subrufus</i> ..	999	<i>Poa cæspitosa</i> ...	8, 302
<i>Piloprepes</i> ...	930	<i>pratensis</i> ...	9
<i>Pimelea collina</i> ...	283	<i>Podargus gouldii</i> ...	166
<i>curviflora</i> ...	283	<i>Podiceps australis</i> ...	173
<i>glauca</i> ...	283	<i>gularis</i> ...	173
<i>linifolia</i> ..	283	<i>Podocarpus spinulosa</i> ...	136
<i>spicata</i> ...	136	<i>Podolepis acuminata</i> ...	284
<i>Pionias heteroclitus</i> ...	979	<i>Podontia</i> ...	80
<i>Piper caninum</i> ...	783	<i>Pœcilodryas cerviniventris</i> ...	167
<i>chaba...</i> ...	783	<i>Pœphila acuticauda</i> 110, 169, 408, 412	
<i>Pipturus asper</i> ...	787	<i>atropygialis</i> ...	110
<i>Platia stratiotes</i> ...	787	<i>cincta</i> ...	110, 408
<i>Pithecolobium dulce</i> , ...	761	<i>gouldiæ</i> ...	169
<i>Pitta novæ-hiberniæ</i> ...	443	<i>mirabilis</i> ...	169
<i>Pittosporum</i> ...	419	<i>Polanisia viscosa</i> ...	743
<i>phillyroides</i> ...	265, 306	<i>Polyachus</i> ...	26
<i>undulatum</i> 105, 259, 265, [306		<i>Polycarpon tetraphyllum</i> ...	135, 270
<i>Plagianthus pulchellus</i> ...	268	<i>Polygala Sibirica</i> ...	192, 266
<i>Plagiodera</i> ...	46	<i>Polygonum hydropiper</i> ...	271
<i>Planaria Tasmaniana</i> ...	349, 361	<i>plebejum</i> ...	271
<i>Planaxis brasilianus</i> ...	999	<i>prostratum</i> ..	271
<i>fulva</i> ...	999	<i>strigosum</i> ...	566
<i>mollis</i> ...	999	<i>subsessile</i> ...	566
<i>pigra</i> .	999	<i>Polynemus tetradactylus</i> ...	805
<i>Plantago debilis</i> ...	106	<i>Polyommatus</i> ...	827, 828
<i>varia</i> ...	288	<i>cyanites</i> ...	828
<i>Platalea regia</i> ...	172	<i>erinus...</i> ...	828
<i>Platax vespertilio</i> ...	806	<i>uranites</i> ..	827
<i>Platibis flavipes</i> ...	988	<i>Polyoptilus</i> ...	14
<i>Platycephala</i> ...	78	<i>Polypodium</i> ...	419
<i>Platycephalus insidiator</i> ...	805	<i>hookeri</i> ...	803
<i>Platyceps Wilkinsonii</i> ...	145, 156	<i>punctatum</i> ...	304
<i>Platycercus Barnardi</i> ...	985	<i>quercifolium</i> ...	803
<i>eximius</i> ...	450	<i>serpens...</i> ...	12, 304
<i>Pennantii</i> ...	450, 990	<i>simplicifolium</i> ...	803
<i>Platycerium alcicorne</i> ...	304	<i>Polyprion prognathus</i> ...	1093
<i>Platydesmus flavipennis</i> ...	226	<i>Pomaderris elliptica...</i> ...	105
<i>sulcipennis</i> ...	226, 227	<i>lanigera</i> ...	105, 279
<i>Platygaster</i> ...	1073	<i>ledifolia</i> ...	8
<i>Platymela</i> ..	54	<i>Pomatoceros</i> ...	1032
<i>Platyphanes elongatulus</i> ...	308	<i>Pomatostomus</i> ...	103
<i>oblongus</i> ...	308	<i>rubeculus</i> ...	169
<i>Platythorax</i> ...	117, 122	<i>Pomax umbellata</i> ...	283
<i>rectangularis</i> ...	122	<i>Pongamia glabra</i> ...	1099
<i>transversicollis</i> ...	122	<i>Popilia flavomaculata</i> ...	227
<i>Plectranthus parviflorus</i> ...	106, 290	<i>Poranthera corymbosa</i> ...	268
<i>Pleomorphus</i> ...	26	<i>ericifolia</i> ...	185
<i>Pleurodictyum</i> ...	412, 413	<i>microphylla</i> ...	268
<i>megastoma</i> ...	413	<i>Porella stangeri</i> ...	1040
		<i>Porina inversa</i> ...	680
		<i>Porphyrio bellus</i> ...	172

nimb  
flavi  
fusc  
var.  
nigr  
pate  
var.  
rufur

Prionesthis...

Pristipoma commu  
nigrum

Pristia ...

Problepsia ..  
apollinari  
sancta

Prochærus celer

Procris ...  
amethystina  
cuprea  
cyanota  
empyrea  
subdolea  
viridipulverul

Proetus ...  
Ascanius (?)  
Bowningensis

Promecoderus .

Promecotheca

Prostanthera denticul  
lasianthi  
linearis

Protoparce convolvuli

Prunella vulgaris ..

Psammoperca ..

Psepholax egerius ...  
Pascoeii ...

Psephotus hæmatogast  
hæmatorrhæ

Pseudanthus ..

# INDEX.

xxviii.

	PAGE		PAGE
<i>Pterohælus nitidissimus</i> ...	540	<i>Ptilotis vittata</i> ..	169
<i>nitidiusculus</i> ...	538	<i>Ptilotus obovatus</i> ...	270
<i>obliteratus</i> ..	548	<i>Ptistes coccineopterus</i> ...	170
<i>opatroides</i> ..	544	<i>Ptychopoda rubraria</i> ...	852
<i>ovulum</i> ..	543	<i>Pulex echidnæ</i> ..	109
<i>parallelus</i> ...	542	<i>Pultenea</i> ...	7, 105, 175
<i>Pascoei</i> ...	524	<i>fasciculata</i> ...	982
<i>peltatus</i> 535, 536, 545,	[546]	<i>flexilis</i> ...	105
<i>peltoides</i> ...	546	<i>incurvata</i> ..	272
<i>piceus</i> 524, 525, 526		<i>microphylla</i> ..	272
<i>planus</i> ...	550	<i>mucronata</i> ...	185
<i>pruinosus</i> ...	526	<i>paleacea</i> ...	185
<i>punctipennis</i> ...	544	<i>retusa</i> ..	105
<i>pusillus</i> 307, 540		<i>scabra</i> ...	135, 272
<i>Reichei</i> ...	531	<i>stypheleioides</i> ...	272
<i>Riverinæ</i> ...	523	<i>ternata</i> ...	272
<i>servus</i> ..	539	<i>Punica granatum</i> ...	765
<i>silphoides</i> 529, 538		<i>Purpura chaidea</i> ...	994
<i>sinnaticollis</i> ..	526	<i>muricina</i> ...	994
<i>spunicollis</i> ..	523	<i>neglecta</i> ..	995, 996
<i>squalidus</i> ...	534	<i>nucinata</i> ...	995
<i>striatopunctatus</i> ..	540	<i>sp.</i> ...	994
[546]		<i>Tritoniiformis</i> 995, 996	
<i>subgeminatus</i> ..	537	<i>tuberculatus</i> ...	994
<i>thymaloides</i> ...	549	<i>Pycnoptilus floccosus</i> ..	451
<i>tristis</i> ..	536	<i>Pyrameis Itea</i> 412, 1013, 1014	
<i>vicarina</i> ..	541	<i>Quedius dilatatus</i> ..	471
<i>Walkeri</i> 521, 522, 523,	[524, 526, 529]	<i>Quercus</i> ...	419
<i>Pteroplatea australis</i> ..	1024	<i>Quintinia Sieberi</i> ..	10, 11
<i>Pteropus grandis</i> ...	1091	<i>Quisqualis chinensis</i> ...	763
<i>Pterostylis acuminata</i> ..	294	<i>indica</i> ...	763
<i>clavigera</i> ... 295, 306		<i>lourcleri</i> ...	763
<i>concinna</i> ..	294	<i>Radix mudaris gigantea</i> ...	773
<i>corta</i> ..	294	<i>Radula buccinifera</i> ..	1040
<i>cycnocephala</i> ...	295	<i>Novæ-Hollandiæ</i> ...	1040
<i>longifolia</i> ..	295	<i>physoloba</i> ...	1040
<i>Mitchelli</i> ...	295	<i>Ranunculus hirtus</i> ...	264
<i>mutica</i> ...	295	<i>lappaceus</i> 135, 264	
<i>nutans</i> ...	8, 294	<i>parviflorus</i> ...	264
<i>obtusa</i> ...	295	<i>rivularis</i> ...	135, 264
<i>parviflora</i> 8, 295		<i>Recurvirostra rubricollis</i> ...	171
<i>pedunculata</i> ..	8	<i>Remus sericeus</i> ..	507
<i>reflexa</i> ...	295	<i>Rhacopteris</i> ...	174
<i>rufa</i> ...	295	<i>Rhagodia hastata</i> ...	271
<i>squamata</i> ...	295	<i>linifolia</i> ...	271
<i>striata</i> ...	294, 306	<i>nutans</i> ...	271
<i>Woollai</i> ..	295	<i>Rhinacanthus communis</i> ...	804
<i>Psidium ciliare</i> ...	1052	<i>Rhinopalpa algina</i> ...	979
<i>Psilopus marie</i> ...	445	<i>Rhipidura diemenensis</i> 406, 412	
<i>Psilorhis Victorie</i> ...	1075	<i>preissi</i> ...	167
<i>Ptilotis flavescens</i> ...	169	<i>setosa</i> ...	167





ano  
nig  
oba  
tril  
Rhynchospora aure  
Rhyparida ...  
Rhyssonotus nebul  
Rhytida ptychomph  
Riccardia crassa  
          minima  
          palmata  
Riccia acuminata  
          asprella  
          bullosa  
          crinita  
          crystallina  
          timbrata  
          glauca  
          glaucescens  
          lamellosa  
          marginata  
          nigrella  
          squamata  
          vesiculosa  
Riccinula arachnoidea  
          aspera  
          chaidea  
          fascellum  
          ricinus  
          tuberoulata...  
          undata  
Ricinus communis  
Risella  
          flavescens  
          plicatula  
Riverna ...  
          fluvialis  
Rubus moluccanus

# INDEX.

XXX.

	PAGE		PAGE
<i>Saragus gagates</i> ...	655, 671	<i>Scaraphites heros</i> ...	124
<i>geminatus</i> ...	655, 668	<i>hirtipes</i> ...	124
<i>incisus</i> ...	654, 655, 656	<i>humeralis</i> ...	124
<i>infelix</i> ...	654, 662	<i>intermedius</i> ...	124
<i>interruptus</i> ...	654, 660	<i>laticollis</i> ...	124
<i>laevicollis</i> ...	654, 657, 658	<i>latipennis</i> ...	124
	[659, 662	<i>Lernæus</i> ..	124
<i>lævis</i> ...	655, 671	<i>lucidus</i> ...	124
<i>levicostatus</i> ...	654, 659	<i>Macleayi</i> ...	124
<i>limbatus</i> ...	655, 665	<i>Martini</i> ...	124
<i>luridus</i> ..	654, 662, 663	<i>Mastersi</i> ...	144
<i>magister</i> ...	655, 670	<i>rotundipennis</i> ...	124
<i>marginatus</i> ...	... 675	<i>Silenus</i> ...	122
<i>marginellus</i> ..	654, 661	<i>Scelodonta</i> ...	42
<i>Odewahnii</i> ...	654, 658	<i>Scenopœus dentirostris</i>	1075
<i>opacipennis</i> ..	654, 661	<i>Schizoporella hyalina</i>	339, 346
<i>orbicularis</i> ...	.. 672	<i>linearis</i>	339
<i>ovalis</i> ...	655, 674	<i>Schizorhina atropunctata</i>	141
<i>Pascoei</i> ...	655, 669	<i>bakewellii</i>	141
<i>patelliformis</i> ...	655, 672	<i>bassii</i> ...	141
<i>reticulatus</i> ...	654, 663	<i>bestii</i> ...	141
<i>rotundatus</i> ...	672, 673	<i>dorsalis</i> ...	141
<i>rudis</i> ...	654, 659	<i>frontalis</i> ...	141
<i>rugosipennis</i> ...	654, 664	<i>ocellata</i> ...	141
<i>rugosus</i> ...	654, 659	<i>palmata</i> ...	141
<i>simplex</i> ...	655, 665, 667	<i>phillipsii</i> ...	141
<i>Spinolæ</i> ...	654, 657	<i>Schizosternus</i> ...	36
<i>striatipennis</i> ...	655, 668	<i>Schmidelia cobbe</i> ...	752
<i>subrugosus</i> ...	655, 673	<i>Schœniclus albescens</i>	171
<i>tarsalis</i> ...	655, 666	<i>Schœnus brevifolius</i> ..	300
<i>testudineus</i> ...	... 675	<i>Brownii</i> ...	300
<i>thymaloides</i> ...	... 549	<i>imberbis</i> ...	300
<i>unicarinatus</i> ...	655, 674	<i>Scirpus fluitans</i> ...	800
<i>Sarcina lutea</i> ...	... 144	<i>grossus</i> ...	800
<i>Sarcocephalus cordatus</i>	... 769	<i>setaceus</i> ..	300
<i>glaberrimus</i> ..	768	<i>Scitala</i> ...	225, 226
<i>nudulatus</i> ...	768	<i>Scleranthus biflorus</i> ...	270
<i>subditus</i> ...	768	<i>Scleria scrobiculata</i> ...	800
<i>Sarcochilus falcatus</i> ...	... 11	<i>Scolyptus</i> ...	133
<i>Sarotricha</i> ...	924, 925	<i>Scoparia dulcis</i> ...	779
<i>exophila</i> ...	... 925	<i>Scopodes fasciolatus</i> ...	219
<i>undulana</i> ...	... 925	<i>Scorpiis</i> ...	992
<i>Sarrothripa</i> ...	... 925	<i>Scotosia metarhodata</i>	908
<i>Sauloprocta picata</i> ...	... 167	<i>Scutellaria humilis</i> ...	186
<i>Scævola hispida</i> ...	... 186	<i>mollis</i> ...	186, 291
<i>Hookeri</i> ...	... 982	<i>Scymnus</i> ...	92
<i>microcarpa</i> ...	... 186	<i>Scythrops Novæ-Hollandiæ</i>	410
<i>oppositifolia</i> ..	422	<i>Sebæa albidiflora</i> ...	192
<i>suaveolens</i> ...	... 565	<i>ovata</i> 8, 136, 192, 288	
<i>Scaphites</i> ...	... 1103	<i>Securinea obovata</i> ...	784
<i>Scaraphites</i> ...	115, 117, 123	<i>Seisura nana</i> ...	167
<i>Bacchus</i> ...	... 124	<i>Selaginella</i> ...	419
<i>crenaticollis</i> ...	... 124	<i>uliginosa</i> ...	8
<i>gigas</i> ...	... 124	<i>Selenurus annulatus</i>	238



*Sedum* *ac-*  
*Sedum* *glau-*  
*Sedum* *glau-*  
*Sedum* *carpinif-*  
*corrugata*  
*humilis*  
*Kingii*  
*retan-*  
*rhombifol-*  
*Siebera* *Billard-*  
*ericoide-*  
*stephen-*  
*Siegesbeckia* *or-*  
*Silene* *gallica*  
*Silene* *artema-*  
*Sisymbria*  
*Siphonaria* *corr-*  
*lirata*  
*Sittella* *chrysop-*  
*leucopte-*  
*pilata*  
*Sinocrornis* *flave-*  
*Sonchus* *australis*  
*Solanum* *avicular-*  
*campan-*  
*cinereum*  
*ferox*  
*melonger-*  
*nigrum*  
*sanctum*  
*stelligeru-*  
*tuberosu-*  
*verbascif-*  
*Solarium* *depressa-*  
*perspecti-*  
*planulata*  
*Solenognathus* *or-*

# INDEX.

xxxii.

	PAGE		PAGE
<i>Staphylococcus pyogenes</i>	...	<i>Styphelia sapida</i> ...	292
<a href="#">[aureus]</a> ...	143	<a href="#">scoparia</a> ...	292
<i>Staurocephalus Murchisoni</i>	100, 102	<a href="#">strigosa</a> ...	292
<i>Steganomma</i> ...	133	<a href="#">triflora</a> ...	106
<a href="#">porcatum</a> ...	133	<a href="#">tubiflora</a> ...	292
<i>Stellaria flaccida</i> ...	135, 270	<a href="#">urceolata</a> ...	292
<a href="#">glauca</a> ...	270	<a href="#">virgata</a> ...	292
<a href="#">multiflora</a> ...	270	<a href="#">viridis</a> ...	262, 291
<a href="#">pungens</a> ...	270	<i>Suaeda maritima</i> ...	566
<i>Stemonitis ferruginea</i> ...	174	<i>Sula cyanops</i> ...	679
<a href="#">fusca</a> ...	174	<i>Swainsona coronillifolia</i> ...	273
<i>Stenochorus simplex</i> ...	1011	<a href="#">Fraseri</a> ...	273
<i>Stenopora</i> ...	1104	<a href="#">galegifolia</a> ...	273
<i>Stephania bernandifolia</i> ...	565	<a href="#">monticola</a> ...	273
<i>Sterculia foetida</i> ...	748	<a href="#">oroboides</a> ...	273
<i>Sterna anglica</i> ...	173	<a href="#">phacifolia</a> ...	273
<a href="#">frontalis</a> ...	173	<a href="#">phacoides</a> ...	273
<a href="#">melanorhyncha</a> ...	173	<i>Symmetrodes</i> ...	920
<i>Stethomela</i> ...	55	<a href="#">nitens</a> ...	920
<i>Stethopachys</i> ...	16	<a href="#">sciocosma</a> ...	920
<i>Stictopelia cuneata</i> ...	171	<i>Sympetes</i> ...	514, 550, 635, 651
<i>Stigmatops ocularis</i> ...	169	<a href="#">contractus</a> ...	652
<a href="#">subocularis</a> ...	169	<a href="#">Macleayi</a> ...	652
<i>Stigmodera</i> ...	141	<a href="#">tricostellus</a> ...	652
<a href="#">Duboulayi</a> ...	1019	<i>Symphyogyna Brasiliensis</i> ...	1054
<i>Stipa semibarbata</i> ...	301	<a href="#">interrupta</a> ...	1053
<i>Stomiopera unicolor</i> ...	169	<a href="#">obovata</a> ...	1054
<i>Streblus asper</i> ...	723, 786	<a href="#">rhizobola</a> ...	1054
<i>Strepera arguta</i> ...	405, 406	<i>Symphyonema</i> ...	6
<a href="#">intermedia</a> ...	405, 412	<a href="#">montanum</a> ...	1077
<a href="#">melanoptera</a> ...	406, 412	<i>Synatractus</i> ...	312
<i>Streptocaulon banmii</i> ...	772	<a href="#">variabilis</a> ...	312
<i>Streptococcus pyogenes</i> ...	574	<i>Syncarpia</i> ...	621
<i>Strix delicatula</i> ...	166, 441	<i>Synodita</i> ...	83
<a href="#">lulu</a> ...	441	<i>Synoicus australis</i> ...	171
<i>Stromateus niger</i> ...	805	<i>Synoum glandulosum</i> ...	566
<i>Strombus epimellus</i> ...	998	<i>Tabernæmontana</i> ...	771, 772
<a href="#">flammeus</a> ...	998	<a href="#">orientalis</a> ...	772
<a href="#">floridus</a> ...	998	<a href="#">pandacaqui</a> ...	772
<a href="#">flosculosus</a> ...	998	<a href="#">sphærocarpa</a> ...	690, 771
<a href="#">mutabilis</a> ...	998	<i>Tadorna radjah</i> ...	172, 446
<i>Strumatophyna</i> ...	48	<i>Tamarindus indica</i> ...	759
<i>Sturnia reflexa</i> ...	259, 293	<i>Tapes</i> ...	243
<i>Stylidium laricifolium</i> ...	136	<i>Tappesia</i> ...	18
<a href="#">lineare</a> ...	186	<i>Tecoma australis</i> ...	11, 290
<i>Stypandra caespitosa</i> ...	8	<i>Telephorus Froggatti</i> ...	237
<a href="#">glauca</a> ...	297	<a href="#">Mosamanni</a> ...	235
<i>Styphelia attenuata</i> ...	292	<a href="#">rubriceps</a> ...	236, 237
<a href="#">elliptica</a> ...	292	<a href="#">rufiventris</a> ...	236
<a href="#">ericoides</a> ...	292	<i>Telesto</i> ...	829, 833
<a href="#">humifusa</a> ...	292	<a href="#">chaostola</a> ...	830
<a href="#">læta</a> ...	291	<a href="#">crypsargyra</a> ...	829
<a href="#">microphylla</a> ...	292	<a href="#">dactyliota</a> ...	831

	PAGE		PAGE
<i>Selenurus apicalis</i> ...	237	<i>Sorocostia albalis</i> ...	923
<i>viridipennis</i> ...	238	<i>arachneis</i> ...	923
<i>Semecarpus albosens</i> ...	753	<i>biguttalis</i> ..	923
<i>anacardium</i> ..	753	<i>cycota</i> ...	923, 924
<i>philippinensis</i> ...	753	<i>heycha</i> ...	923
<i>Sesuvium</i> ...	1042	<i>irenica</i> ...	923
<i>Sonchium australe</i> ...	8, 286	<i>lencoma</i> ...	924
<i>lanceus</i> ...	286	<i>parallacta</i> ...	923
<i>vagus</i> ...	286, 565	<i>tornotis</i> ...	923
<i>Serpula</i> ...	1033	<i>trigonota</i> ..	923
<i>Sesamum indicum</i> ...	690	<i>retustella</i> ...	923
<i>Sesbania aculeata</i> ...	755	<i>Sowerbaea juncea</i> ...	8, 136
<i>egyptiaca</i> ...	755	<i>Sparganium angustifolium</i> ..	288
<i>Setaria glauca</i> ...	801	<i>Spartothamnus</i> ...	305
<i>Sicyllus</i> ...	78	<i>juncea</i> ...	301
<i>Sida carpinifolia</i> ...	746	<i>puberulus</i> ...	125
<i>corrugata</i> ...	268	<i>Spergularia rubra</i> ..	270
<i>humilis</i> ...	746	<i>Spermacoce hispida</i> ..	769
<i>Kingii</i> ...	1101	<i>scaberrima</i> ..	770
<i>retusa</i> ...	746	<i>stricta</i> ...	771
<i>rhombifolia</i> ...	566, 746	<i>Spharanthus indicus</i> ..	770
<i>Siebera Billardieri</i> ...	566	<i>Sphærexochus</i> ..	80
<i>ericoides</i> ...	565	<i>Sphaerolobium</i> ...	?
<i>stephensonii</i> ..	565	<i>vimineum</i> ..	135
<i>Siegesbeckia orientalis</i> ...	8, 285	<i>Sphaeromorpha Simoni</i> ..	80
<i>Silene gallica</i> ...	9	<i>Sphecotheres australis</i> ..	470
<i>Siligo setacea</i> ...	805	<i>axillaris</i> ...	470

# INDEX.

xxxii.

	PAGE		PAGE
<i>Staphylococcus pyogenes</i>	143	<i>Styphelia sapida</i> ...	292
[aureus] ...	143	scoparia ...	292
<i>Staurocephalus Murchisoni</i>	100, 102	strigosa ...	292
<i>Steganomma</i> ...	133	triflora ...	106
porcatum ...	133	tubiflora ...	292
<i>Stellaria flaccida</i> ...	135, 270	urceolata ...	292
glaucula ...	270	virgata ...	292
multiflora ...	270	viridis ...	262, 291
pungens ...	270	<i>Suaeda maritima</i> ...	566
<i>Stemonitis ferruginea</i> ...	174	<i>Sula cyanops</i> ...	679
fusca ...	174	<i>Swainsona coronillifolia</i> ...	273
<i>Stenochorus simplex</i> ...	1011	Fraseri ...	273
<i>Stenopora</i> ...	1104	galegifolia ...	273
<i>Stephania hernandifolia</i> ...	565	monticola ...	273
<i>Sterculia foetida</i> ...	748	oroboides... ..	273
<i>Sterna anglica</i> ...	173	phacifolia ...	273
frontalis ...	173	phacoides ...	273
melanorhyncha ...	173	<i>Symmetrodos</i> ...	920
<i>Stethomela</i> ...	55	nitens ...	920
<i>Stethopachys</i> ...	16	sciocosma ...	920
<i>Stictopelia cuneata</i> ..	171	<i>Sympetes</i> ...	514, 550, 635, 651
<i>Stigmatops ocularis</i> ...	169	contractus ...	652
subocularis ...	169	Macleayi ...	652
<i>Stigmodera</i> ...	141	tricostellus ...	652
Duboulayi ...	1019	<i>Symphyogyna Brasiliensis</i> ...	1054
<i>Stipa senibarbata</i> ...	301	interrupta ...	1053
<i>Stomiopera unicolor</i> ...	169	obovata ...	1054
<i>Streblus asper</i> ...	723, 786	rhizobola ...	1054
<i>Strepera arguta</i> ...	405, 406	<i>Symphyonema</i> ...	6
intermedia ...	405, 412	montanum ...	1077
melanoptera ...	406, 412	<i>Synatractus</i> ...	312
<i>Streptocaulon banmii</i> ...	772	variabilis ...	312
<i>Streptococcus pyogenes</i> ..	574	<i>Syncarpia</i> ...	621
<i>Strix delicatula</i> ...	166, 441	<i>Synodita</i> ...	83
lulu ...	441	<i>Synoicus australis</i> ..	171
<i>Stromateus niger</i> ...	805	<i>Synoum glandulosum</i> ...	566
<i>Strombus epimellus</i> ...	998	<i>Tabernæmontana</i> ...	771, 772
flammeus ...	998	orientalis ...	772
floridus ...	998	pandacaqui ...	772
flonculosus... ..	998	sphærocarpa ...	690, 771
mutabilis ...	998	<i>Tadorna radjah</i> ...	172, 446
<i>Strumatophyina</i> ...	48	<i>Tamarindus indica</i> ..	759
<i>Sturnia reflexa</i> ...	259, 293	<i>Tapes</i> ...	243
<i>Stylidium laricifolium</i> ...	136	<i>Tappesia</i> ...	18
lineare ...	136	<i>Tecoma australis</i> ...	11, 290
<i>Stypandra caespitosa</i> ...	8	<i>Telephorus Froggatti</i> ...	237
glaucula ...	297	Mossmanni ...	235
<i>Styphelia attenuata</i> ... ..	292	rubriceps ...	236, 237
elliptica ...	292	rufiventris ...	236
ericoides ...	292	<i>Telesto</i> ...	829, 833
humifusa ...	292	chaostola ...	830
læta ...	291	crypsargyra ...	829
microphylla ...	292	dactyliota ...	831



*graciosa*  
Shepherd  
zonophan  
**Terminalia** catap  
**Tetragonia** expan  
**Tetratheca** ericifo  
ericoid  
juncea  
pilosa  
thymif  
**Thalaina** Clara  
*Thalassodes*  
byrsopi  
inspera  
scitissis  
**Thallis** ..  
bizonata  
**Thaumastomerus**  
**Thelymitra** ixioide  
longifo  
megcal  
nuda  
venosa  
*Themiscyra latifer.*  
**Therapon** ...  
**Thesium** australe  
**Thespeia** populnea  
**Thinnfeldia** odonto  
**Threkiornis** strict  
**Thylacoleo** ..  
**Thysanotus** juncea  
Paterson  
tuberosa  
**Tigrioides** ...  
nana

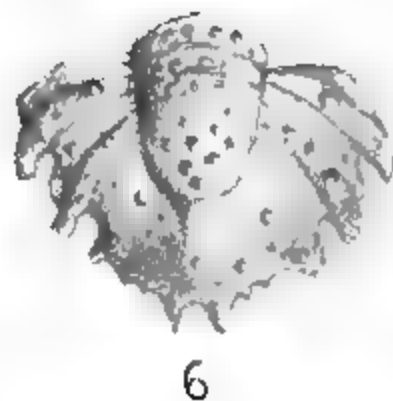
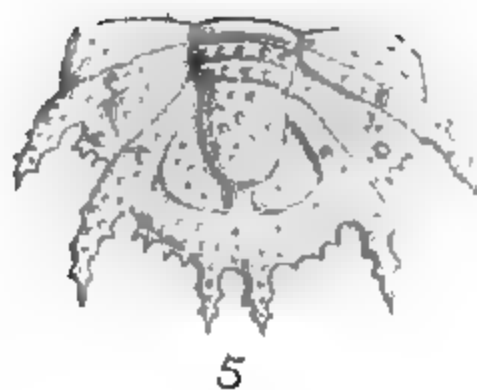
# INDEX.

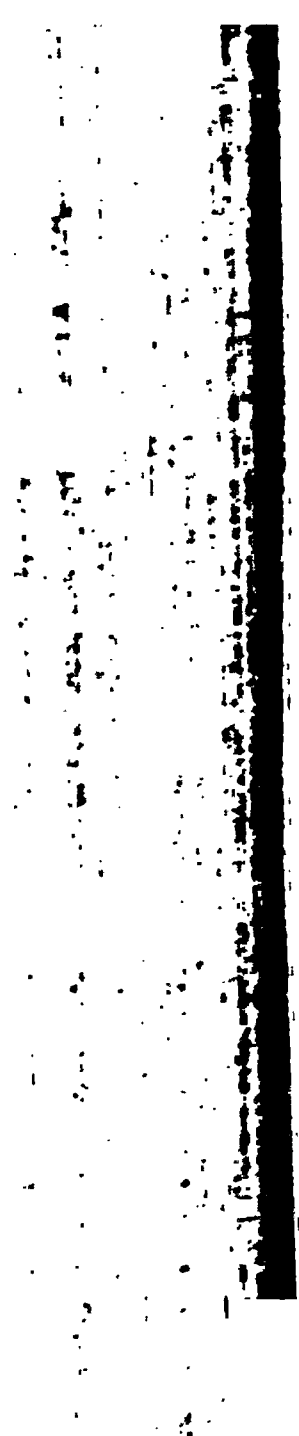
XXIV.

	PAGE		PAGE
<i>Trochus perspectivumaculus</i>	...	<i>Vitis clematidea</i>	...
<i>variegatus</i>	...	<i>hypoglauca</i>	...
<i>Trygon walga</i>	...	<i>lanceolaria</i>	...
<i>Tubularia gracilis</i>	...	<i>pedata</i>	...
<i>Turrilepas</i> sp.	...	<i>trifolia</i>	...
<i>Tylophora asthmatica</i>	...	<i>Vitrina superba</i>	...
<i>barbata</i>	...	<i>Vittadinia australis</i>	...
<i>tenuis</i>	...	<i>scabra</i>	...
<i>Typha angustifolia</i>	...	<i>Vittaria elongata</i>	...
<i>Typhis Angasi</i>	...	<i>Voacanga (Orchipeda)</i>	...
<i>Typophorus</i>	...	<i>Voluta Guentheri</i>	...
	...	<i>harpa</i>	...
<i>Umbraculum flabellatum</i>	...	<i>nucleus</i>	...
<i>Unio</i>	...	<i>pattersonia</i>	...
<i>Uredo lini</i>	...	<i>perdicina</i>	...
<i>Urena lobata</i>	...	<i>Vulsella</i>	...
<i>Urolitha</i>	...		...
<i>bipunctifera</i>	...	<i>Wahlenbergia gracilis</i>	...
<i>Urtica incisa</i>	...	<i>Waltheria americana</i>	...
<i>Ustilago carbo</i>	...	<i>Wendlandia paniculata</i>	...
<i>Utricularia biloba</i>	...	<i>Wickstroemia indica</i>	...
<i>dichotoma</i>	...	<i>Woodwardia aspera</i>	...
<i>flexuosa</i>	...	<i>caudata</i>	...
<i>uniflora</i>	...	<i>Wrightia pubescens</i>	...
<i>Uvaria purpurea</i>	...	<i>tomentosa</i>	...
	...	<i>Wurmbea dioica</i>	...
<i>Vallisneria spiralis</i>	...		...
<i>Vandellia crustacea</i>	...	<i>Xanthodoule</i>	...
<i>Varanus acanthurus</i>	...	<i>semiochrea</i>	...
<i>Goulthi</i>	...	<i>Xantholinus</i>	...
<i>punctatus</i>	...	<i>Albertii</i>	...
<i>Velleya</i>	...	<i>anachoreta</i>	...
<i>macrocalyx</i>	...	<i>analis</i>	...
<i>montana</i>	...	<i>auriceps</i>	...
<i>paradoxa</i>	...	<i>cervinipennis</i>	...
<i>perfoliata</i>	...	<i>chalcopterus</i>	...
<i>Verbena officinalis</i>	...		...
<i>Vermilia caespitosa</i>	...	<i>chalybeus</i>	...
<i>Vernonia cinerea</i>	...	<i>chloropterus</i>	...
<i>Veronica arguta</i>	...	<i>coelestis</i>	...
<i>perfoliata</i>	...	<i>cribratus</i>	...
<i>plebeja</i>	...	<i>cyaneipennis</i>	...
<i>serpillifolia</i>	...	<i>cyanopterus</i>	...
<i>Victorella pavida</i>	...	<i>erythropterus</i>	...
<i>Villarsia</i>	...	<i>fulgidus</i>	...
<i>reniformis</i>	...	<i>haemorrhous</i>	...
<i>Viminaria denudata</i>	...	<i>holomelas</i>	...
<i>Viola betonicifolia</i>	...	<i>linearis</i>	...
<i>hederacea</i>	...	<i>Lorquini</i>	...
<i>Viscum angulatum</i>	...	<i>orthodoxus</i>	...
<i>articulatum</i>	...	<i>phoenicopterus</i>	...
<i>Vitis</i>	...	<i>punctulatus</i>	...
<i>capriolata</i>	...	<i>rustitarsis</i>	...



	PAGE		PAGE
<i>Xantholinus sideralis</i> ...	486	<i>Xylobanus Froggatti</i> ..	233
<i>socius</i> ..	490	<i>fumosus</i> .	231, 232
<i>Xanthophea</i> ..	218	<i>longicornis</i> ..	232
<i>Xanthorrhæa</i> ...	480	<i>miniaticollis</i> .	232
<i>arborea</i> ...	298	<i>Xylomelum pyriforme</i> ..	136
<i>Xanthosia pilosa</i> ...	280, 566	<i>Xyloteles</i> . . .	412, 1002
<i>Xenica Ella</i> ... ..	976, 977, 979	<i>griseus</i> ...	1012
<i>Kerahawi</i> .	976, 977, 979	<i>Pattersoni</i> ..	1012
<i>lathoniella</i> ...	141, 976	<i>Selwyni</i> ..	1012
<i>orichora</i> ..	976	<i>Xyris complanata</i> ..	186
<i>Xenorhynchus australis</i>	172, 987	<i>Zanthoxylum veneficum</i>	1099
<i>Xerotes Brownii</i> ...	298	<i>Zea mays</i> ...	801
<i>filiformis</i> ...	136	<i>Zelotypia Stacyi</i> 467, 468, 469	[681]
<i>flexifolia</i> ..	186, 298	<i>var. sinuosa</i> ..	469
<i>leucocephala</i> ..	298	<i>Zia</i> ..	923
<i>longifolia</i> ..	298	<i>Zieria cytisoides</i> ..	266
<i>multiflora</i> ...	186	<i>Zonitis pallida</i> .	325
<i>Thunbergii</i> ...	298	<i>Zootoca vivipara</i> ...	1093
<i>Xylobanus ampliatus</i> ...	233	<i>Zornia diphylla</i> 173, 273, 565, 755	
<i>ater</i> ...	233	<i>Zosterops flavogularis</i>	408, 412
<i>atripennis</i> ...	234	<i>Zygophyllum prismathecum</i>	978







2



1bis



1



3



6



4



5



9



8



7





*Calceolaria*  
*maritima* L.



Section al.



a

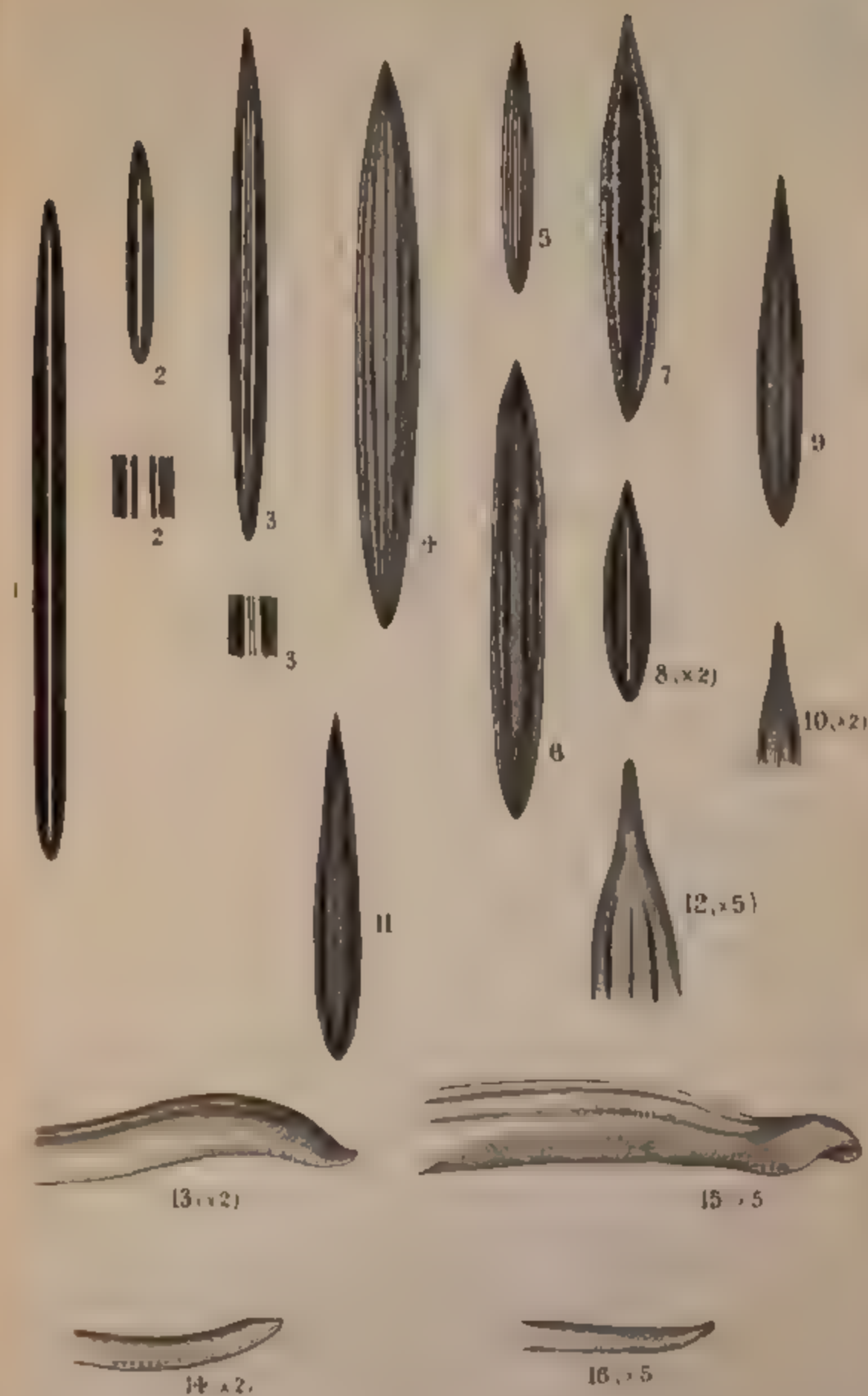


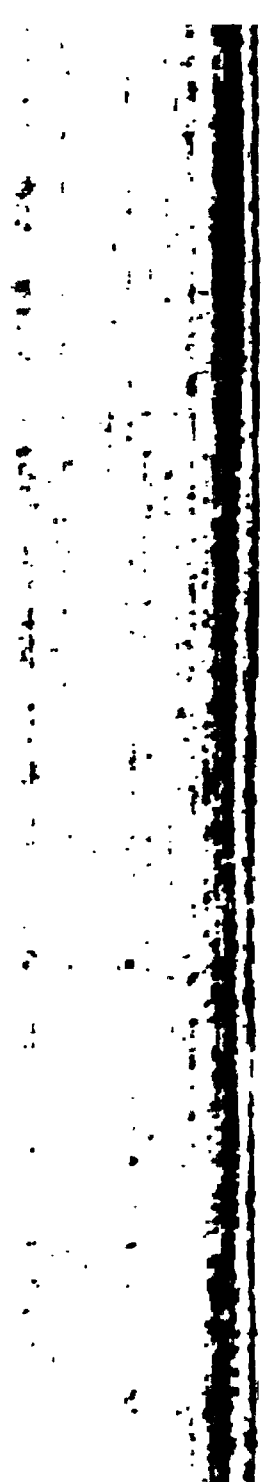


Section 21.











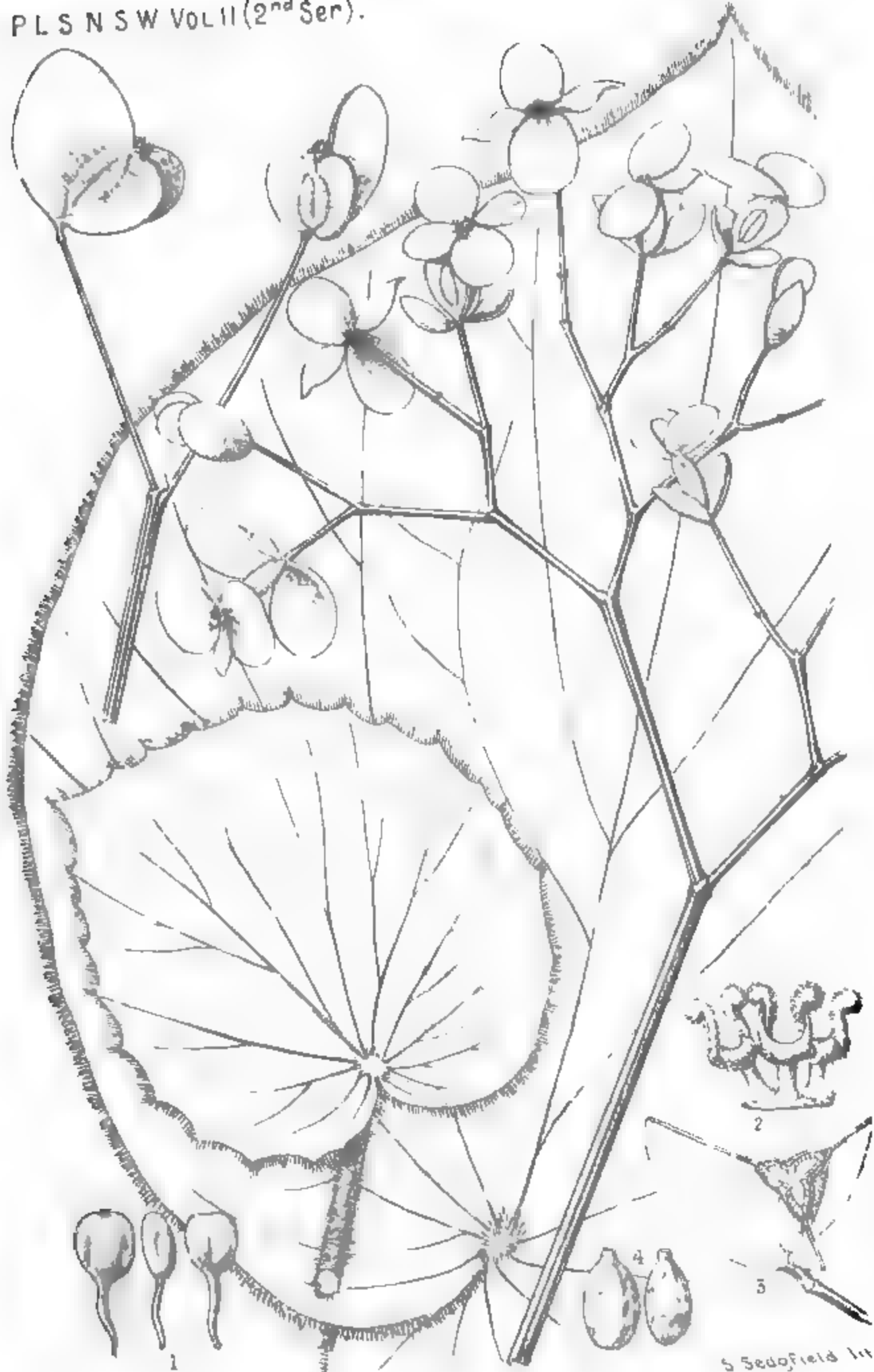
Fv M di-  
Mussaenda Bevan

S Berghfield III



PLS NSW VOL II (2<sup>nd</sup> Ser).

PL VII.

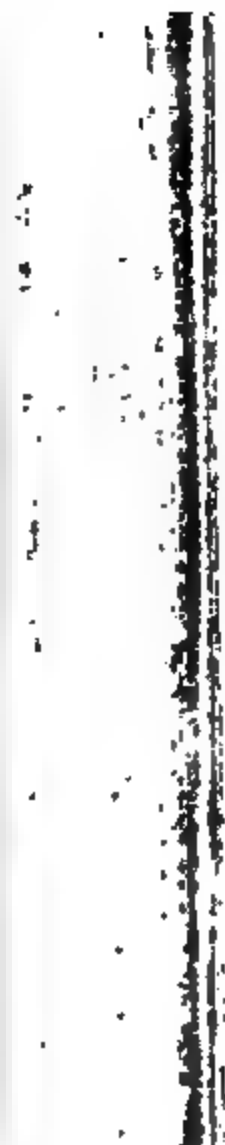


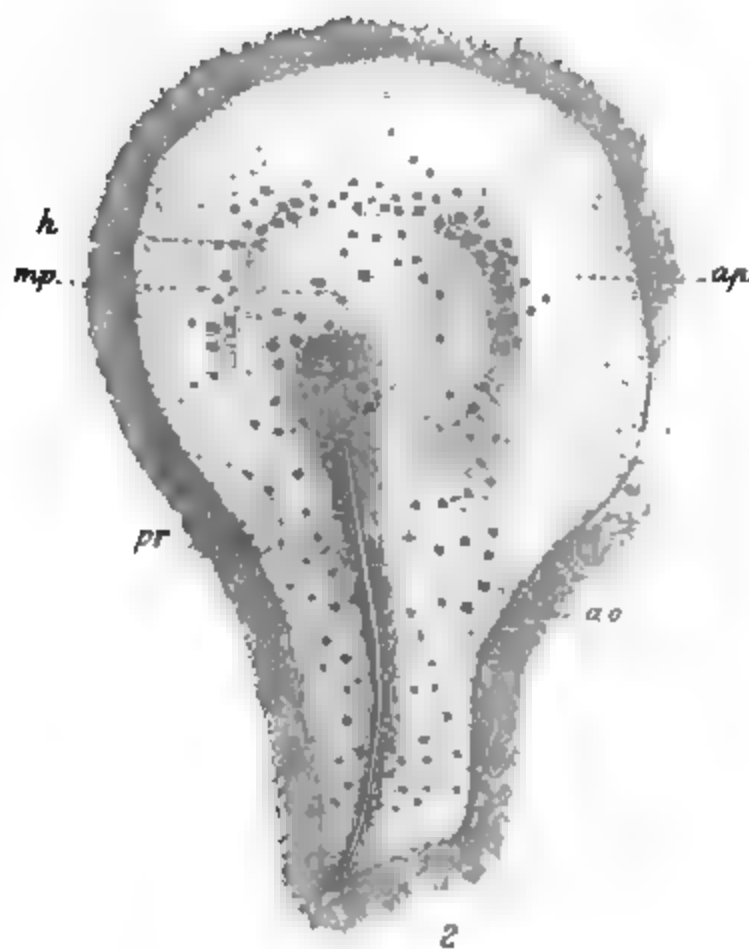
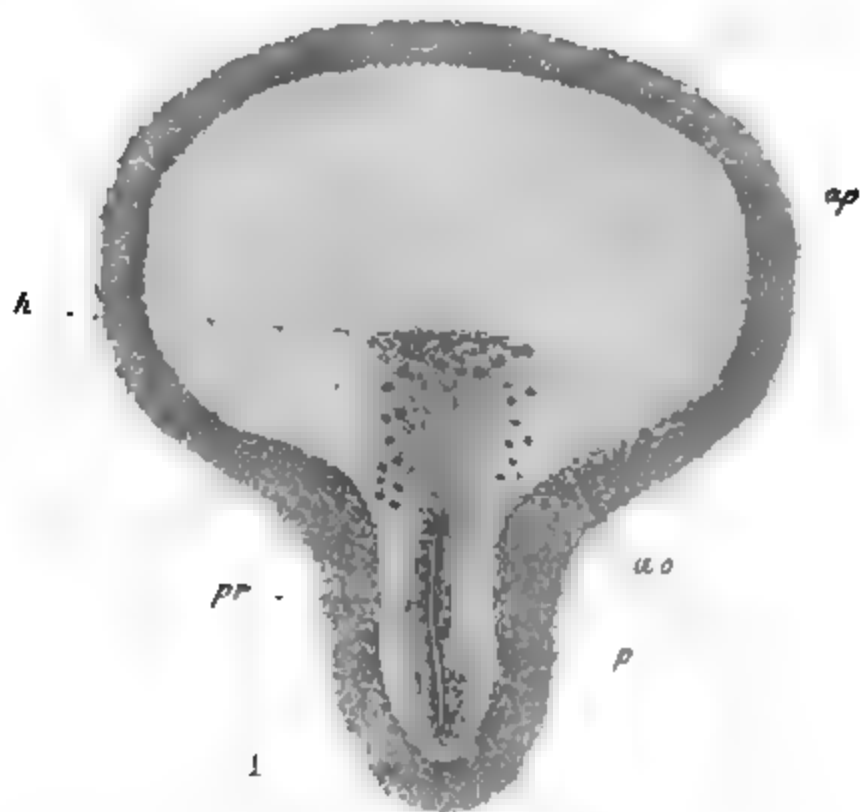
R Gröpp del.

Begonia Sharpeana Fv M

S SedoField lit







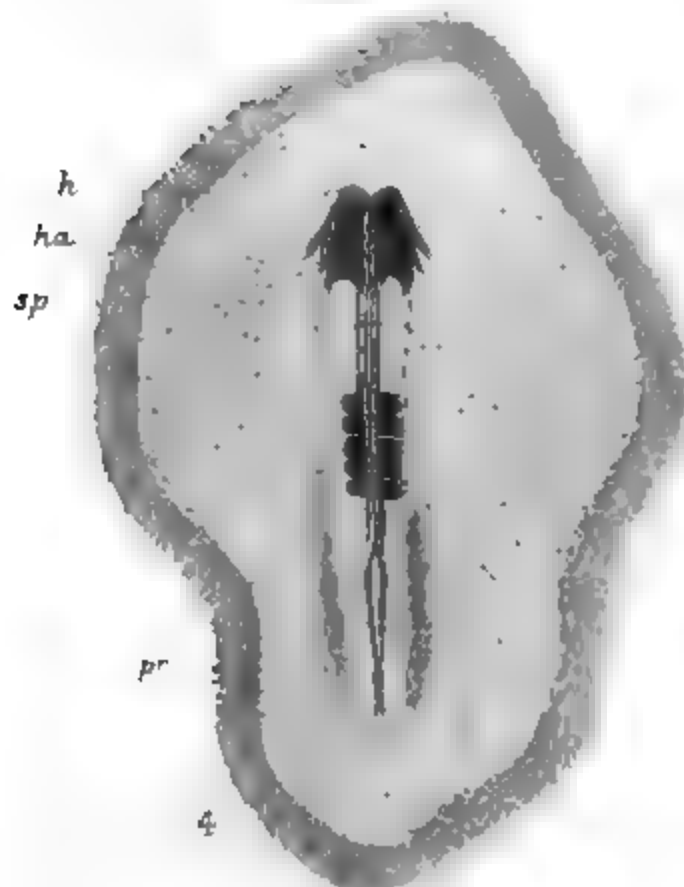
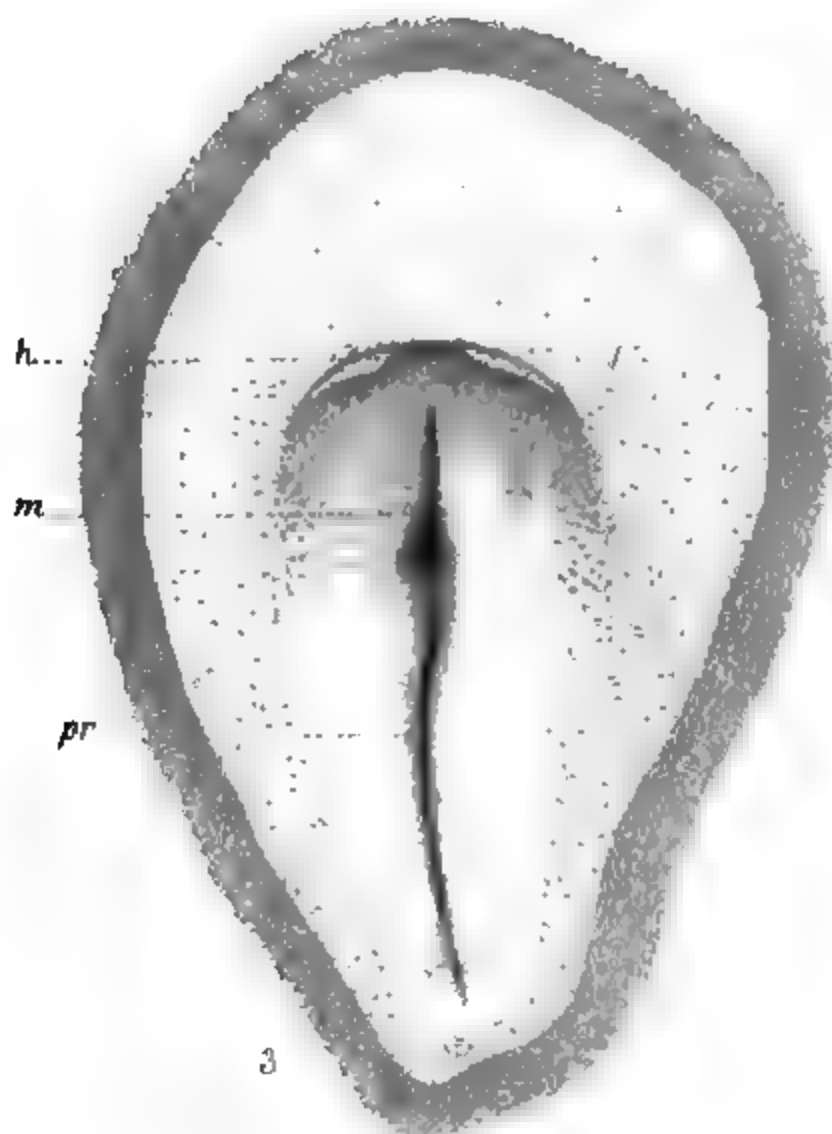


1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

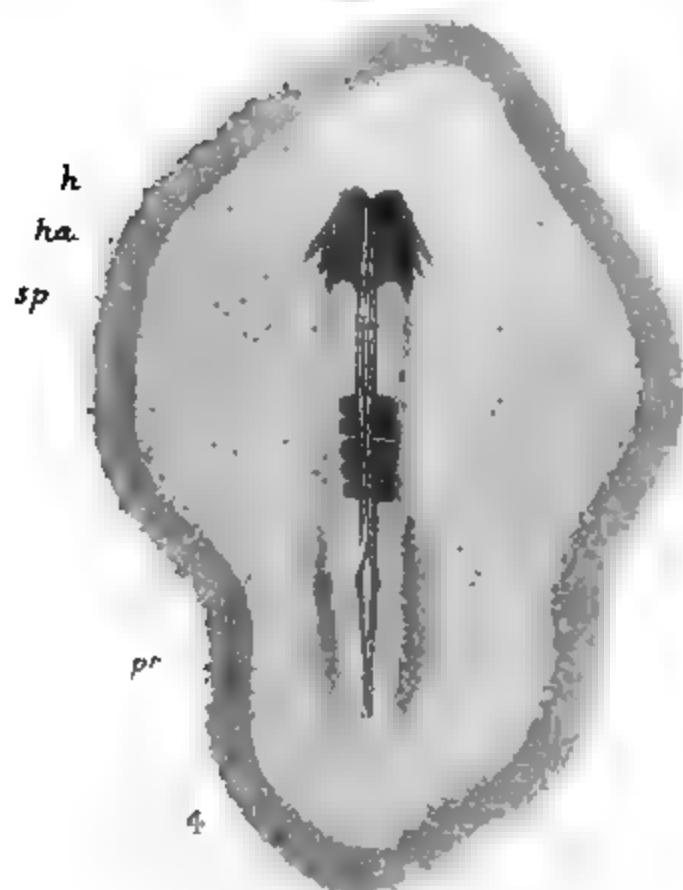
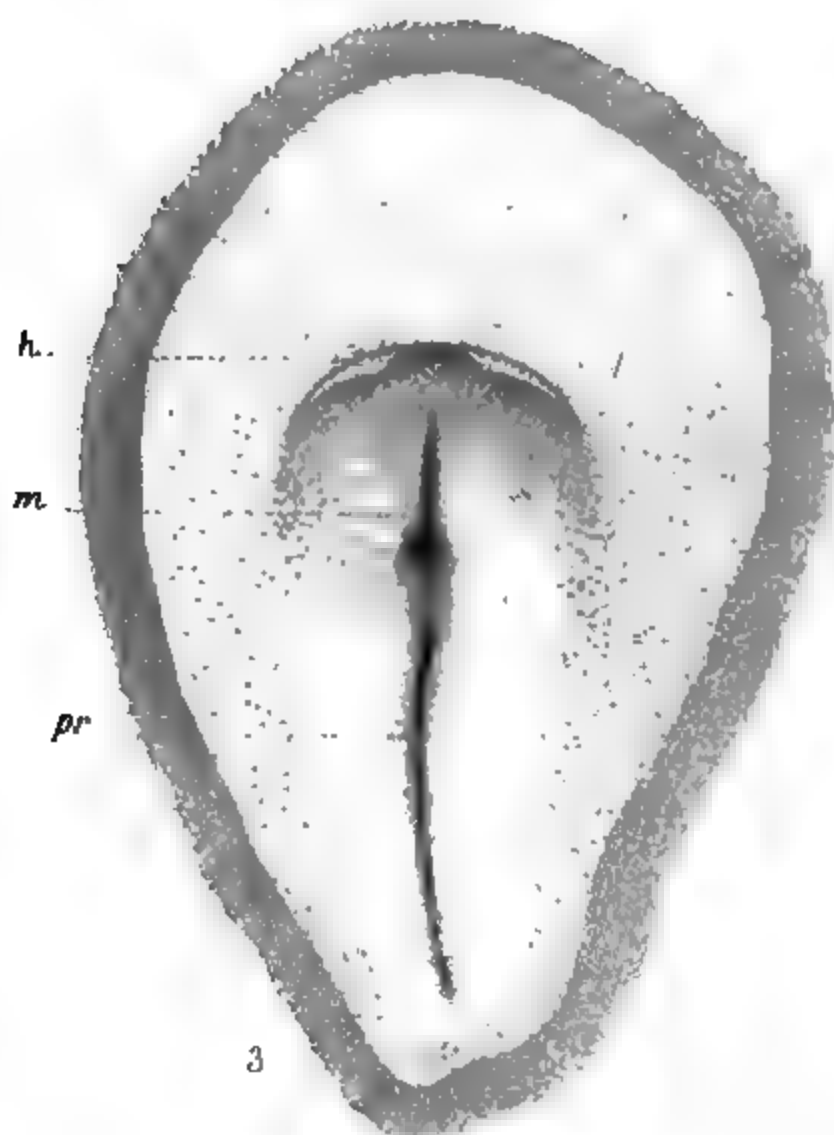
2. The second part of the document outlines the various methods and tools used to collect and analyze data. It includes a detailed description of the data sources and the statistical techniques employed.

3. The third part of the document presents the results of the analysis, showing the trends and patterns in the data. It includes several charts and graphs to illustrate the findings.

4. The fourth part of the document discusses the implications of the results and provides recommendations for future research and action. It highlights the need for continued monitoring and evaluation of the system.



1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".



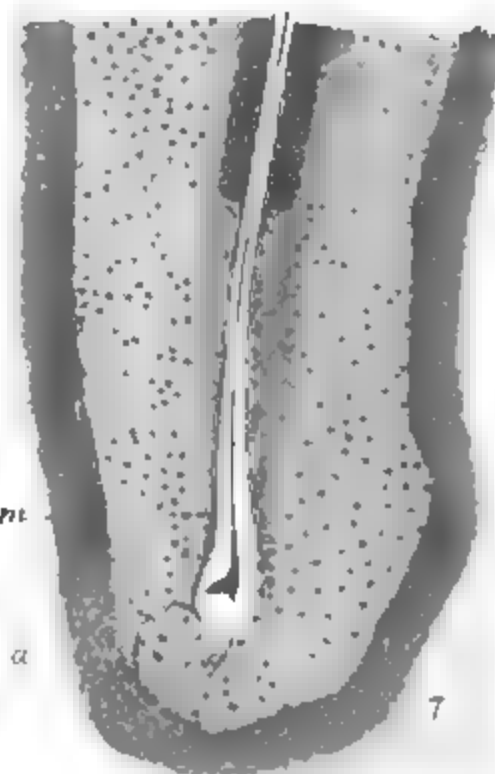
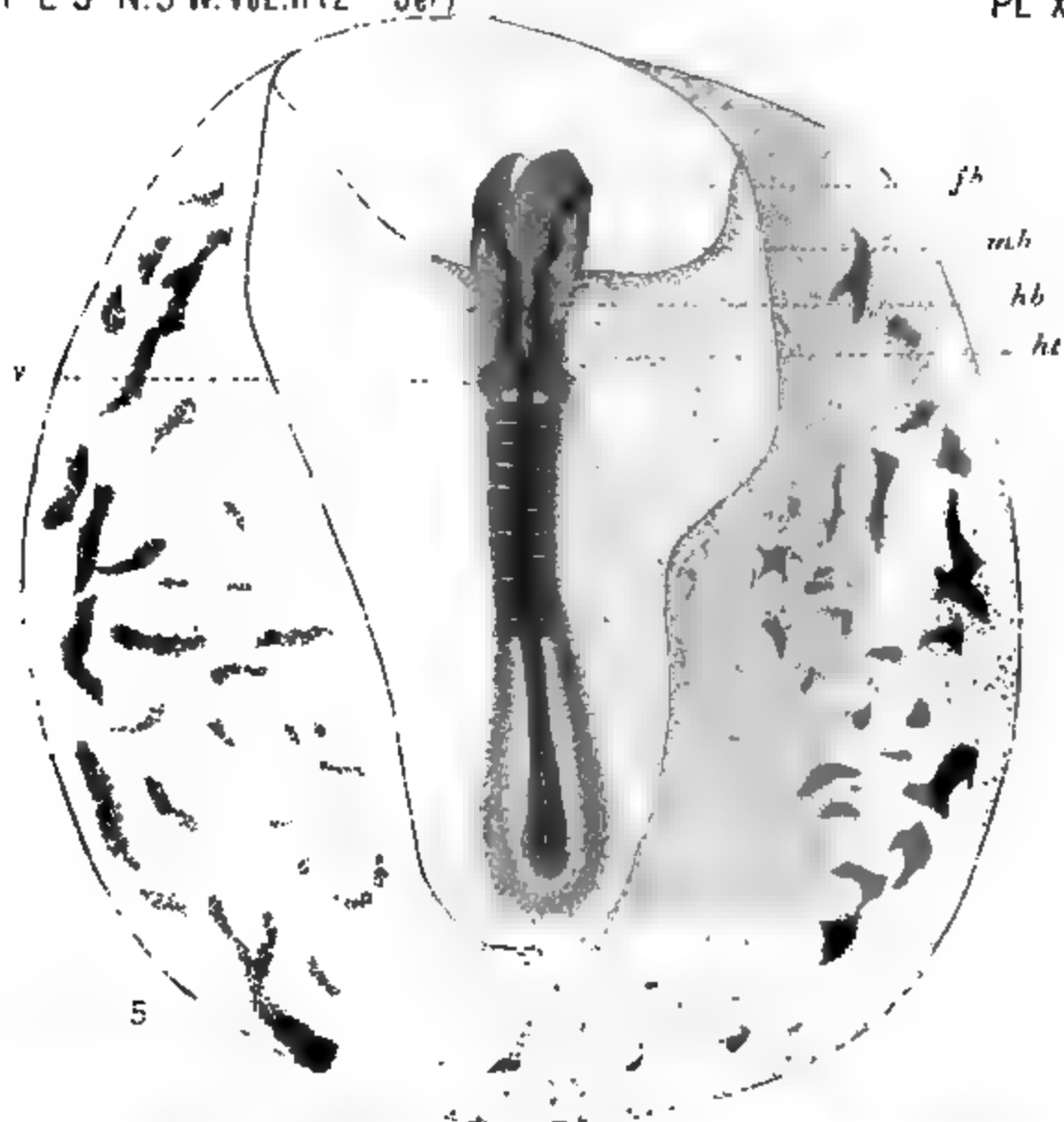


1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It includes a detailed description of the data sources and the statistical techniques employed.

3. The third part of the document presents the results of the analysis, showing the trends and patterns in the data. It includes several charts and graphs to illustrate the findings.

4. The fourth part of the document discusses the implications of the results and provides recommendations for future research and action. It highlights the need for continued monitoring and evaluation of the system.





1. The first part of the document is a list of names and addresses.

2. The second part of the document is a list of names and addresses.

3. The third part of the document is a list of names and addresses.

4. The fourth part of the document is a list of names and addresses.

5. The fifth part of the document is a list of names and addresses.

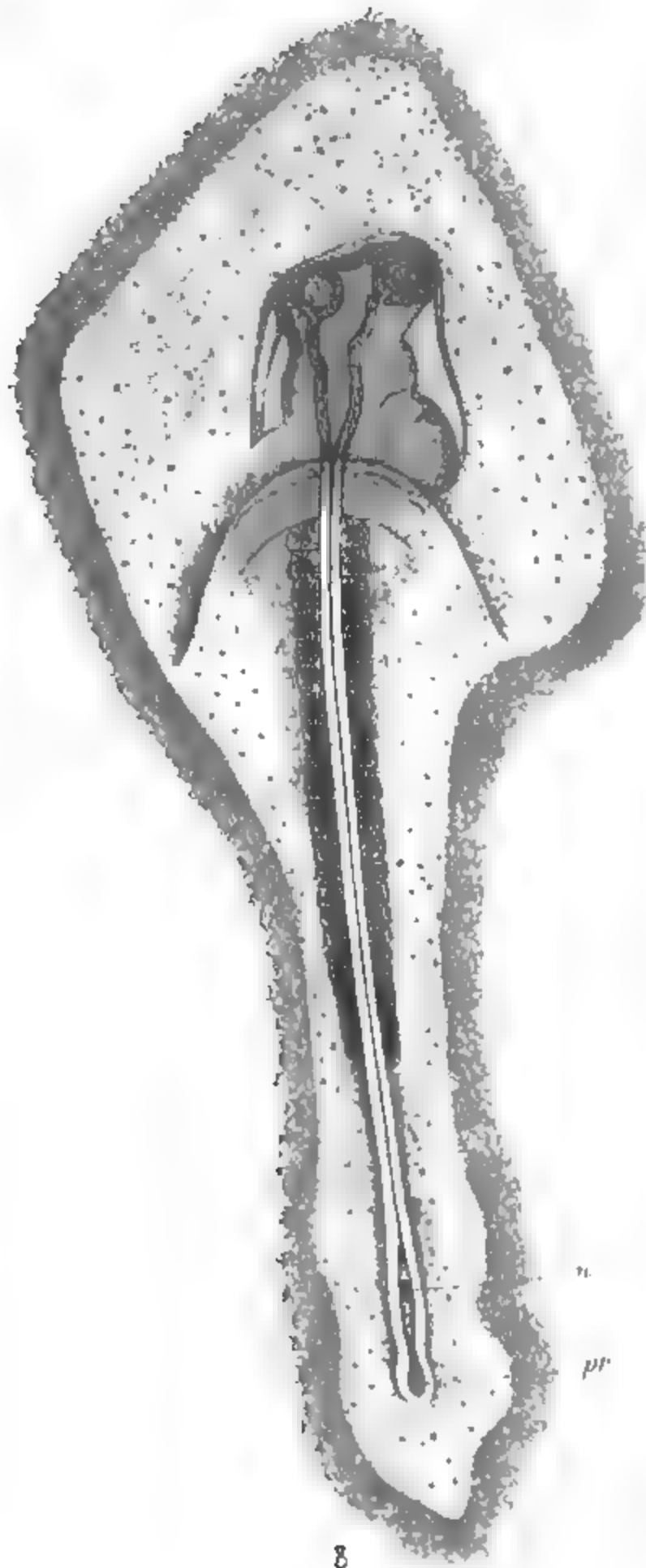
6. The sixth part of the document is a list of names and addresses.

7. The seventh part of the document is a list of names and addresses.

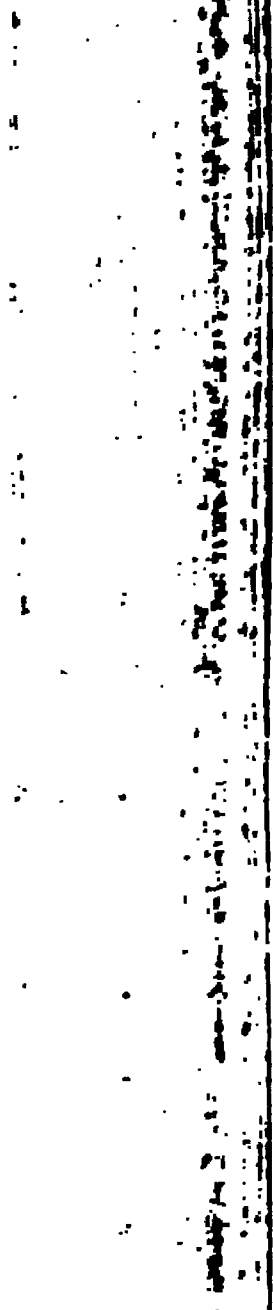
8. The eighth part of the document is a list of names and addresses.

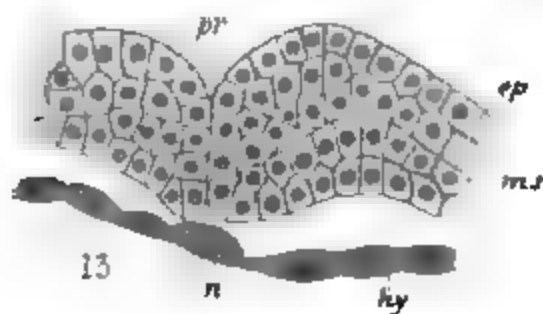
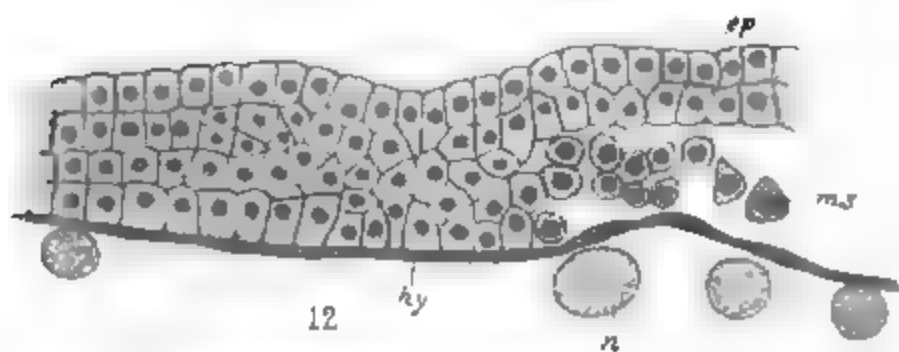
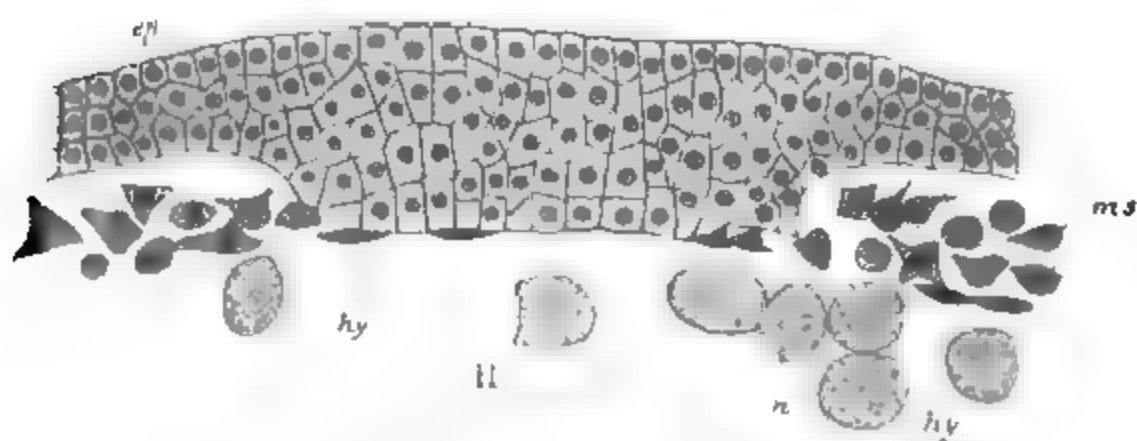
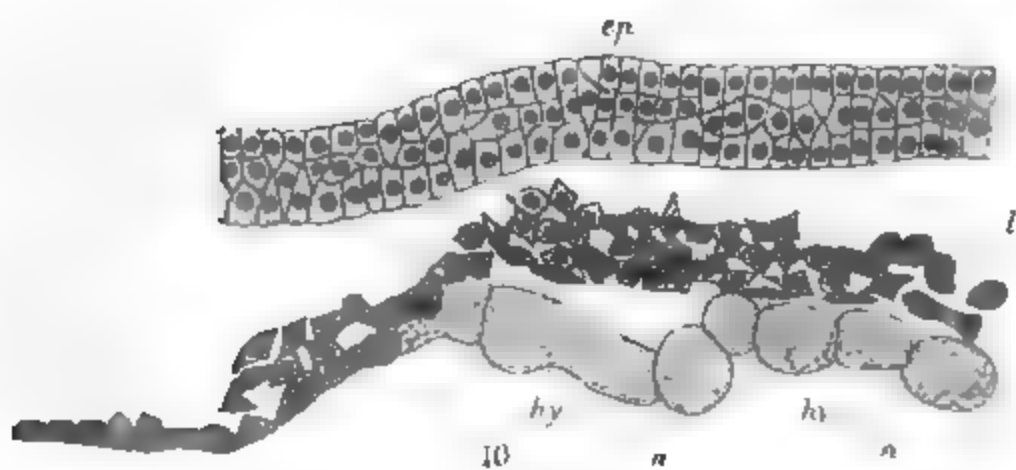
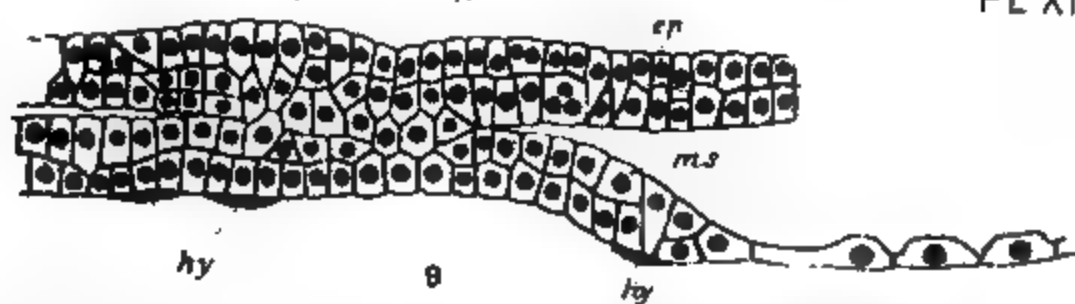
9. The ninth part of the document is a list of names and addresses.

10. The tenth part of the document is a list of names and addresses.

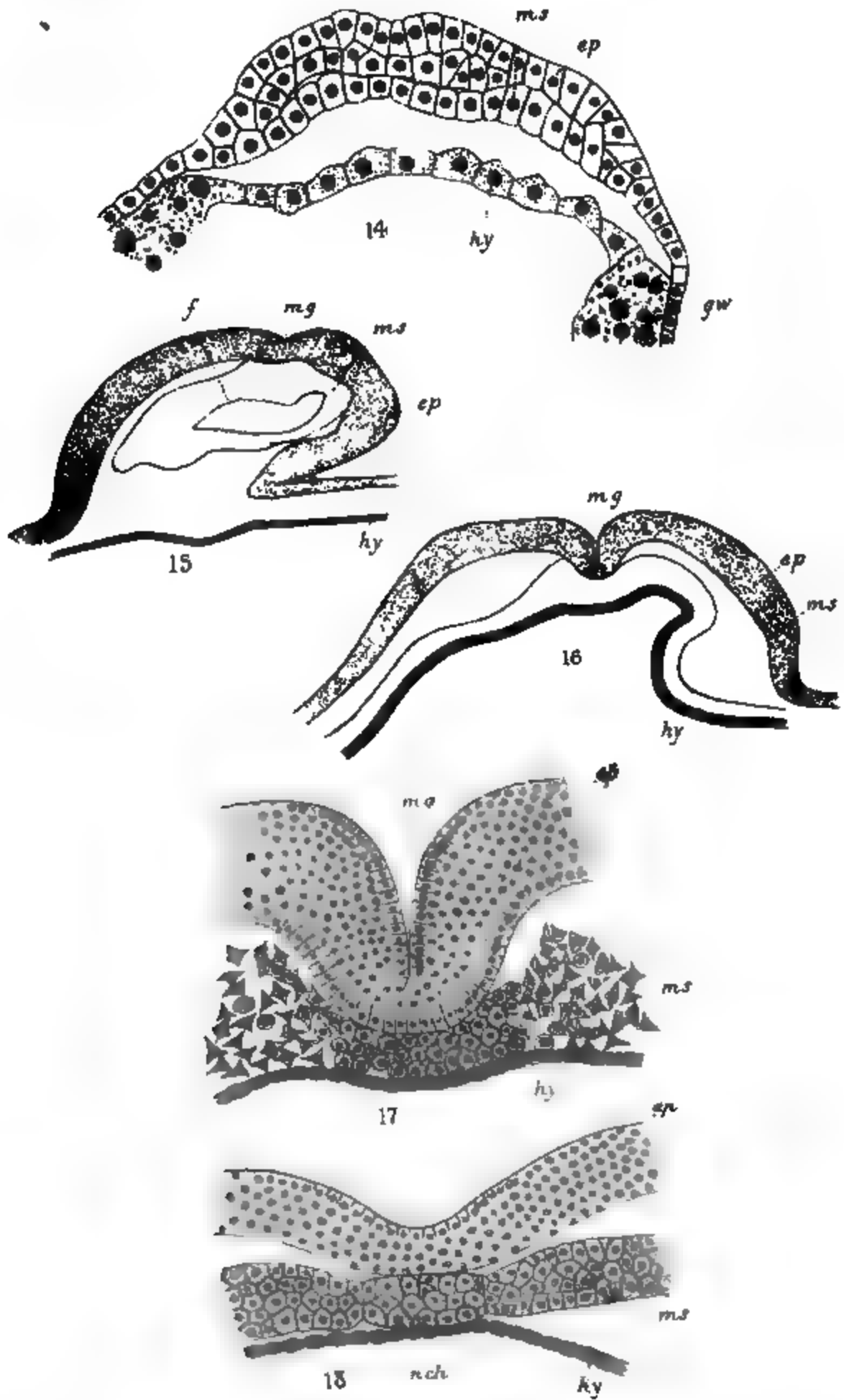


8

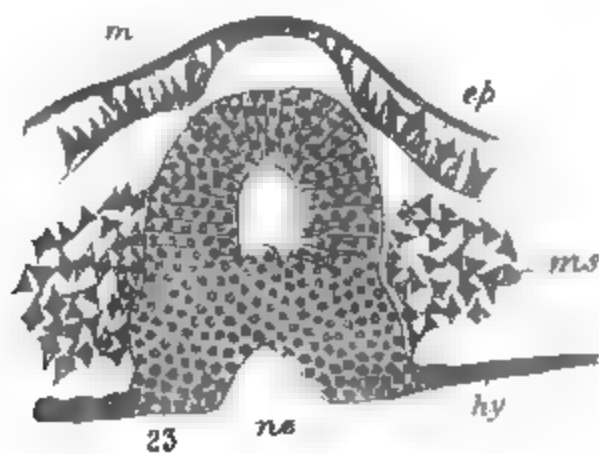
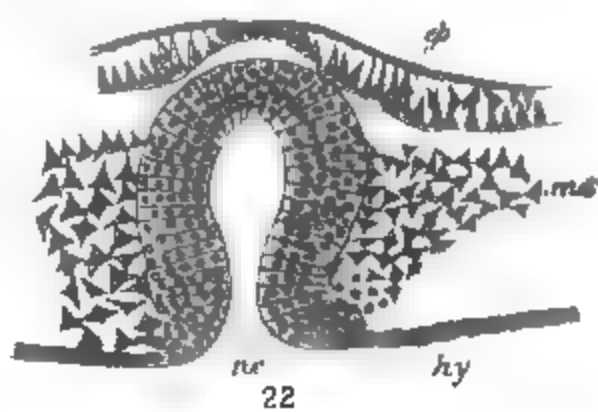
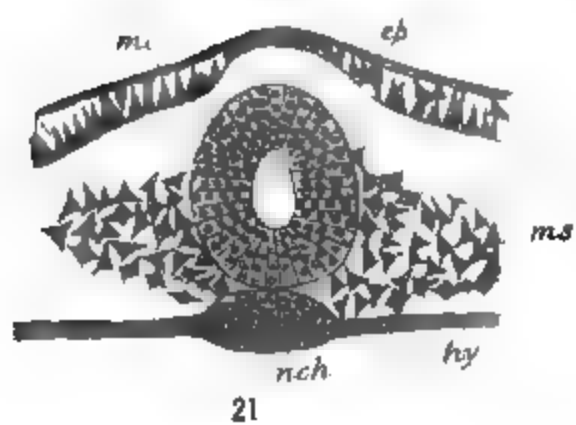
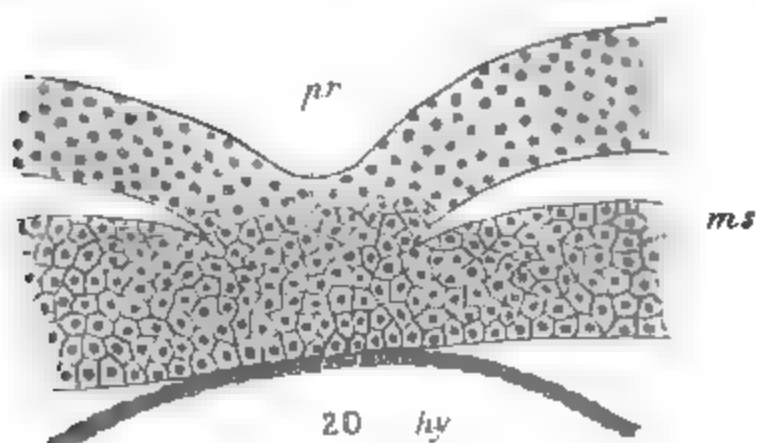
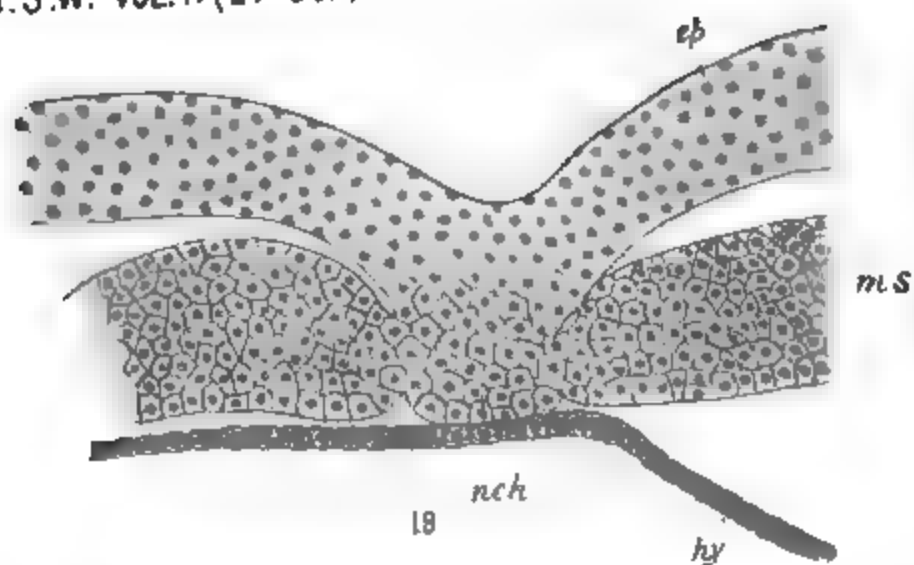




THE UNIVERSITY OF CHICAGO  
LIBRARY  
540 EAST 57TH STREET  
CHICAGO, ILL. 60637  
TEL. 773-936-5000  
FAX 773-936-5001  
WWW.CHICAGO.EDU

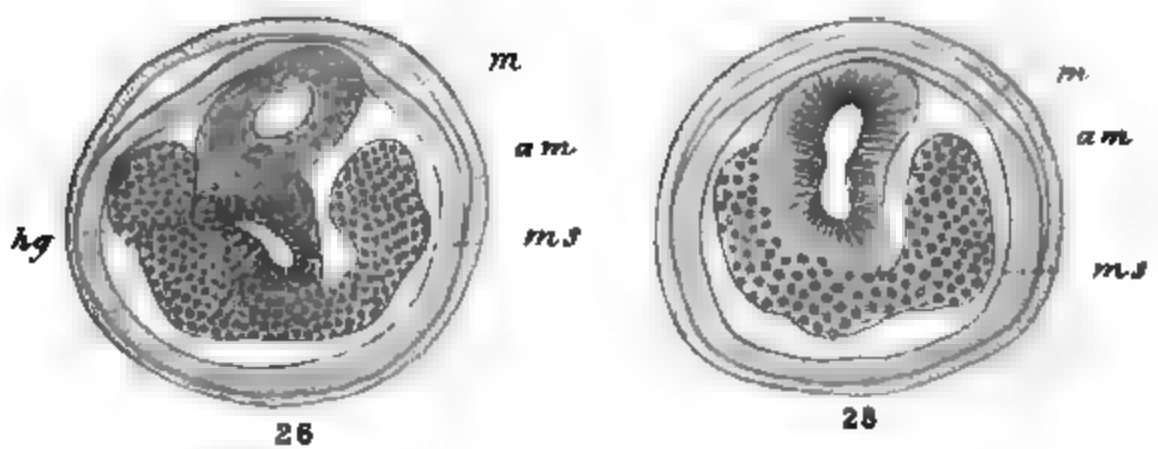
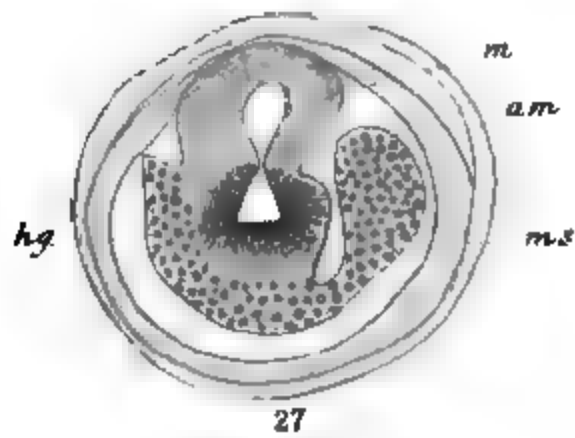
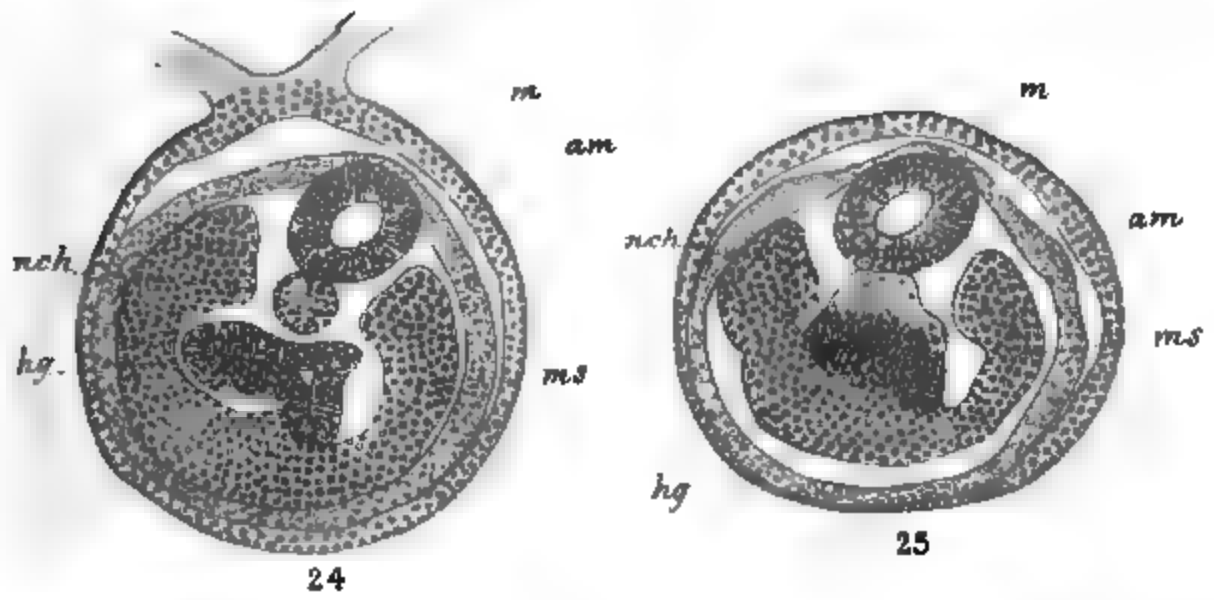




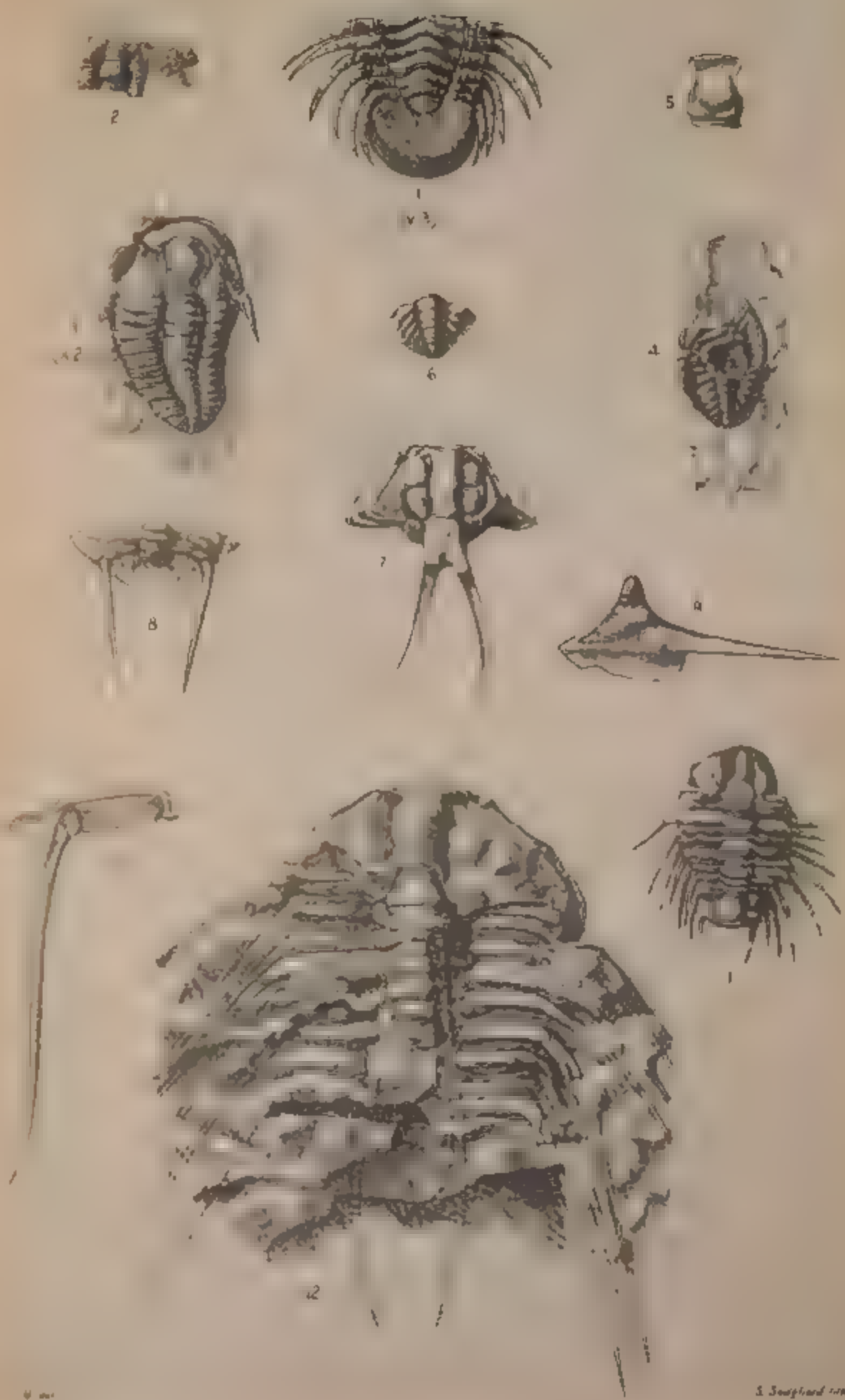




THE UNIVERSITY OF CHICAGO







Bowling Rhobites

S. S. S. S. S.

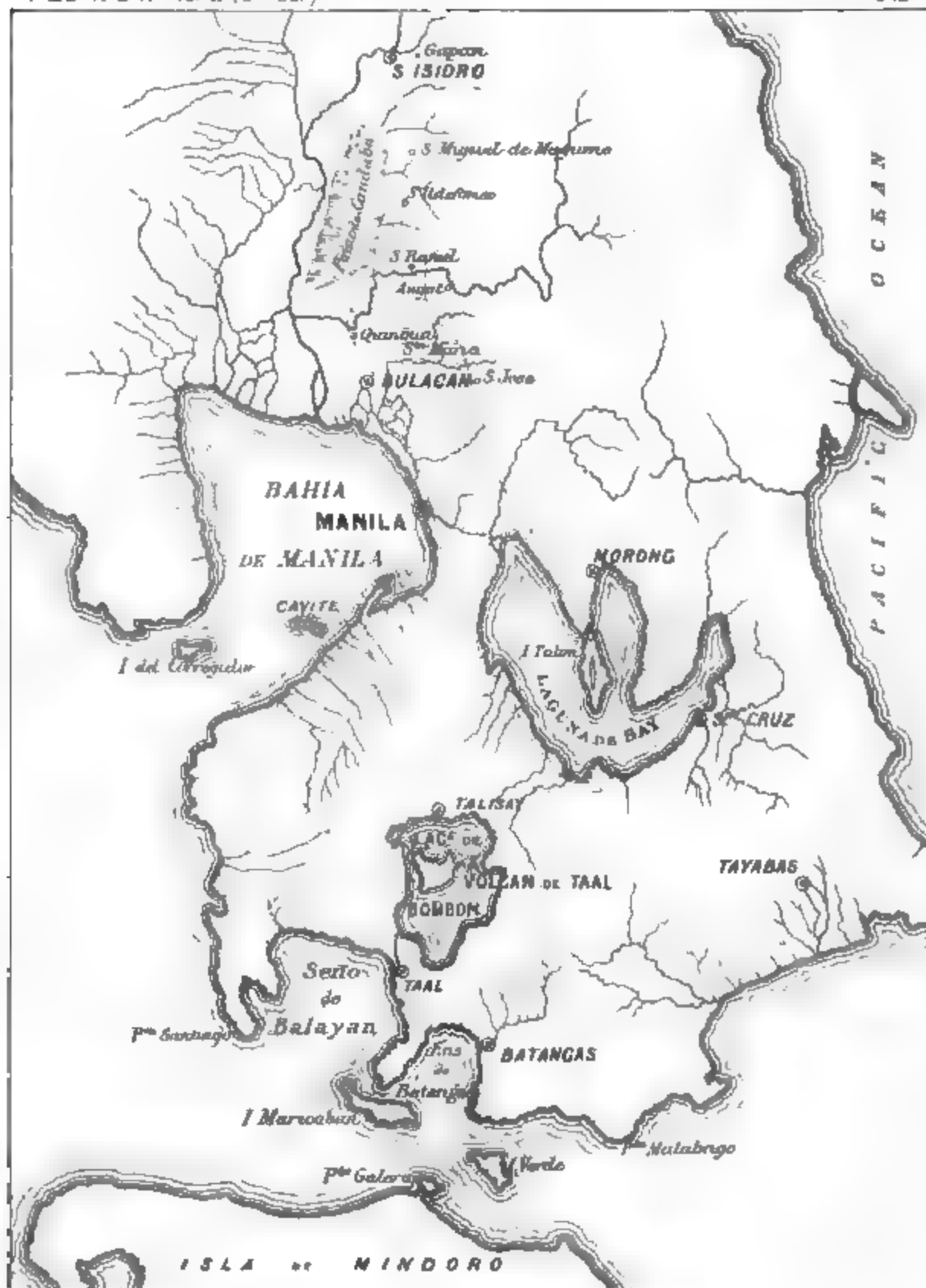




# Mus Burtoni

Fig1	Portion of Lower Jaw	6 times Nat size
2	" " Palate	6 " " "
3	Lower Jaw	3 " " "
4	Hind Foot	3 " " "





33. 1906

 Volcanic tufa

MAP OF S LUZON  
with LAKE BOMBON.





1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It includes a detailed description of the data sources and the statistical techniques employed.

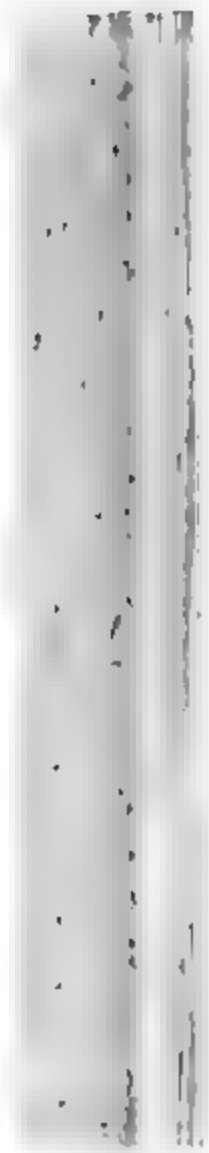
3. The third part of the document presents the results of the analysis, showing the trends and patterns in the data. It includes several charts and graphs to illustrate the findings.

4. The fourth part of the document discusses the implications of the results and provides recommendations for future research and practice. It highlights the need for continued monitoring and evaluation of the system.

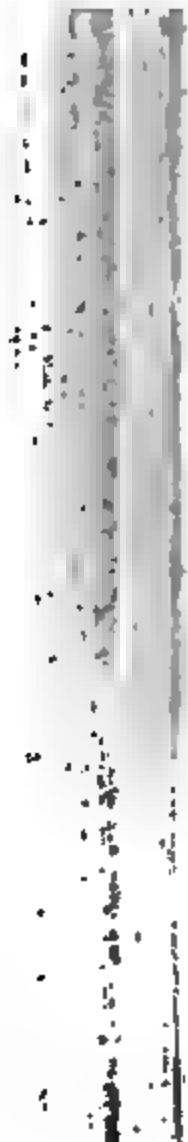


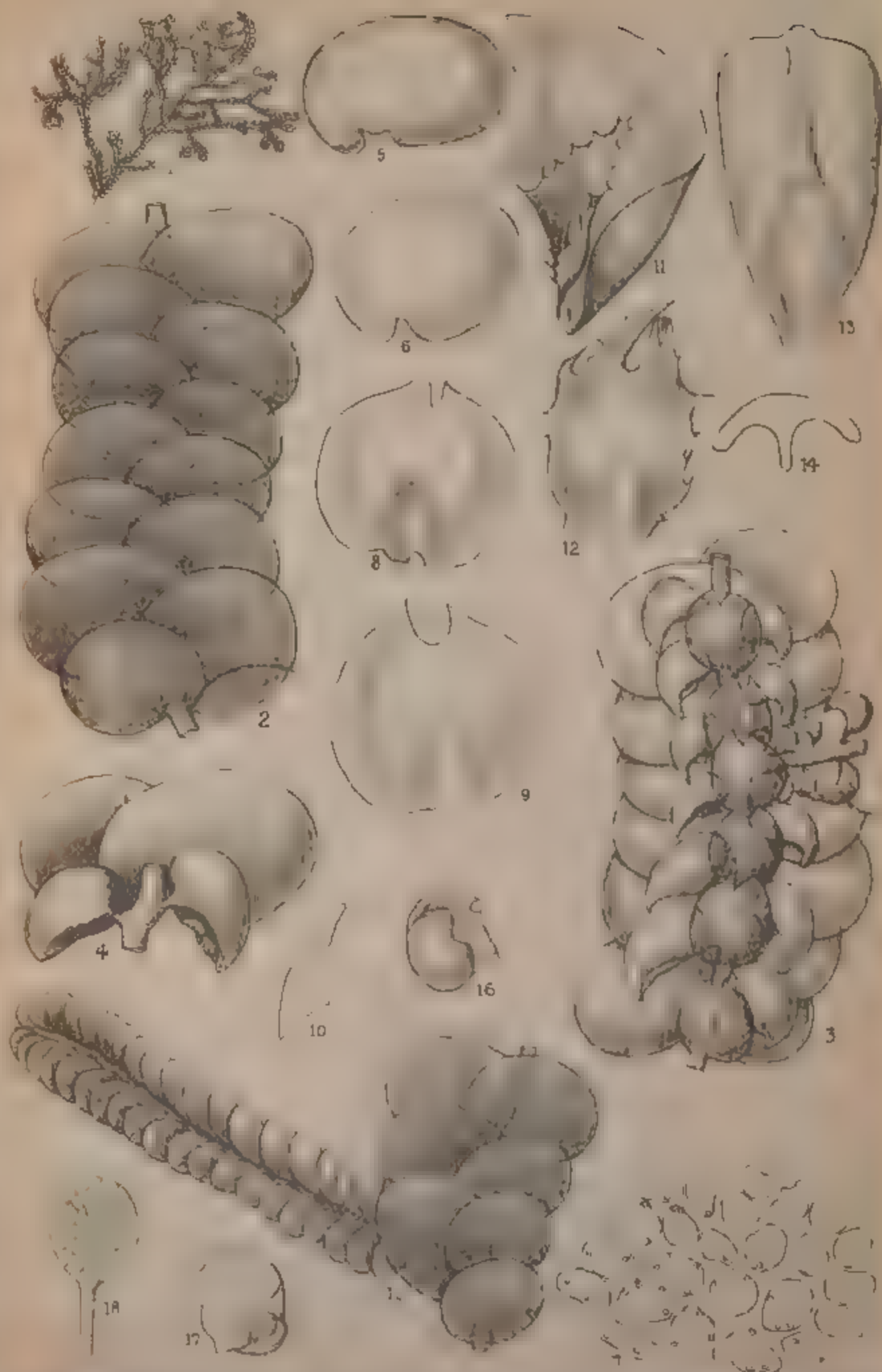








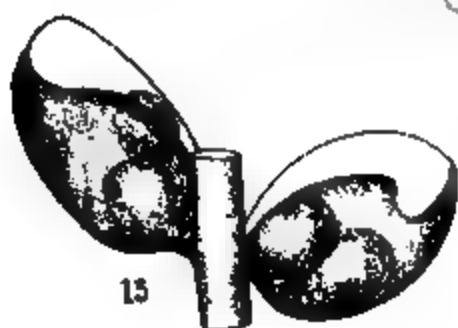
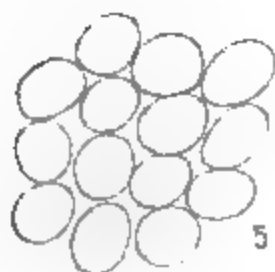
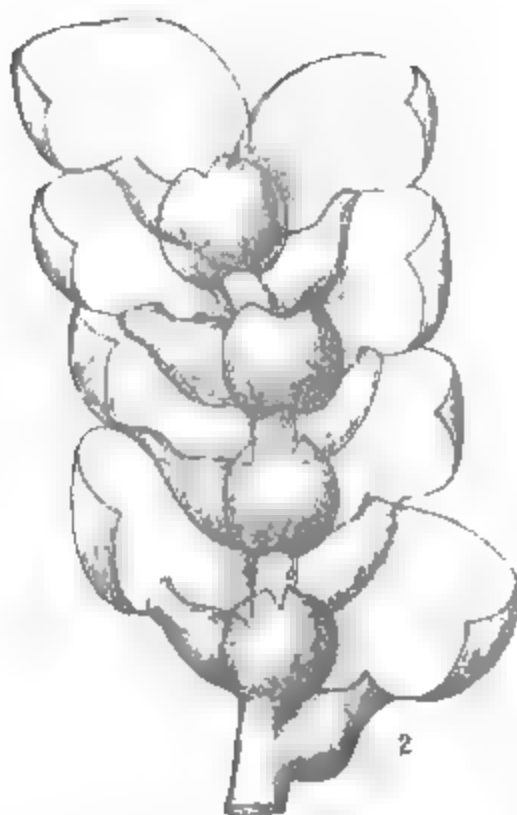






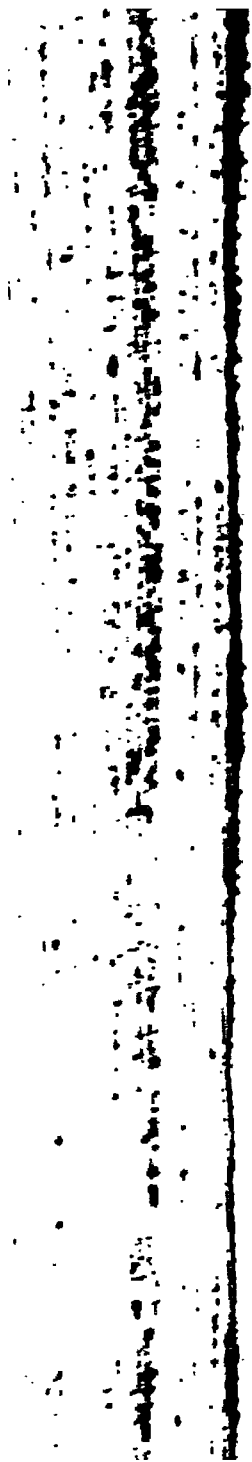
1. The first part of the document is a list of references. The references are listed in a standard format, with the author's name, the title of the work, and the publisher. The references are as follows:

1. The first part of the document is a list of references. The references are listed in a standard format, with the author's name, the title of the work, and the publisher. The references are as follows:

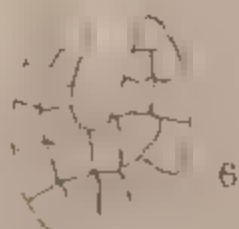




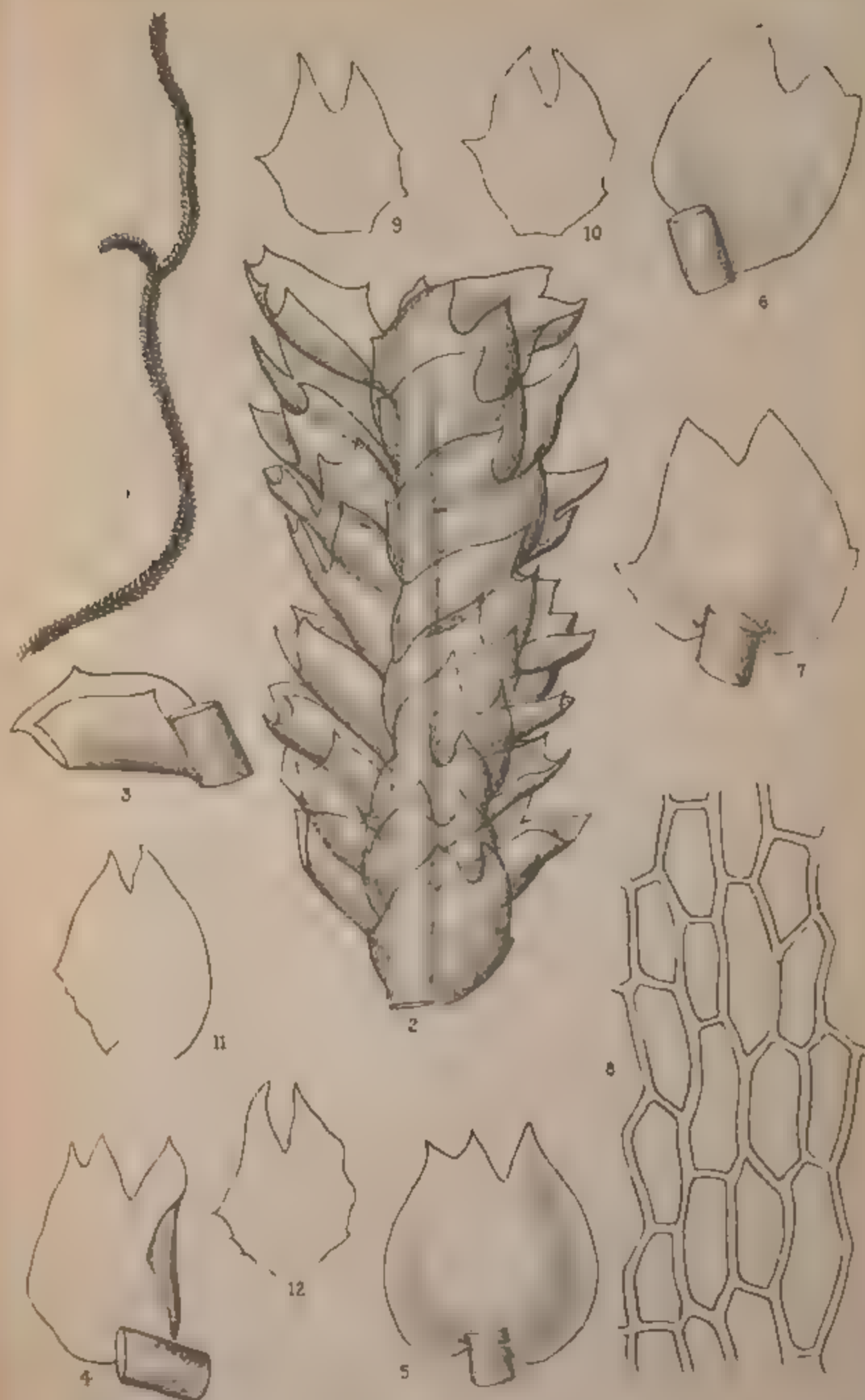




11118,  
1





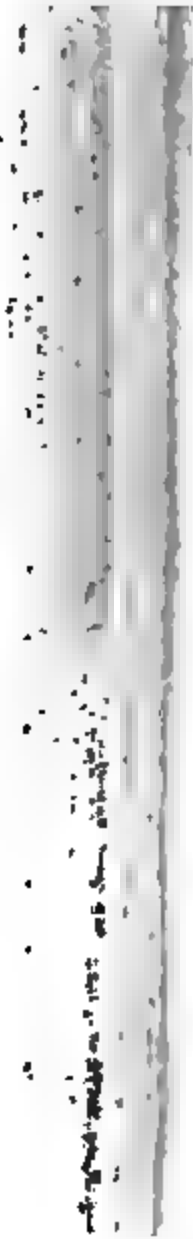


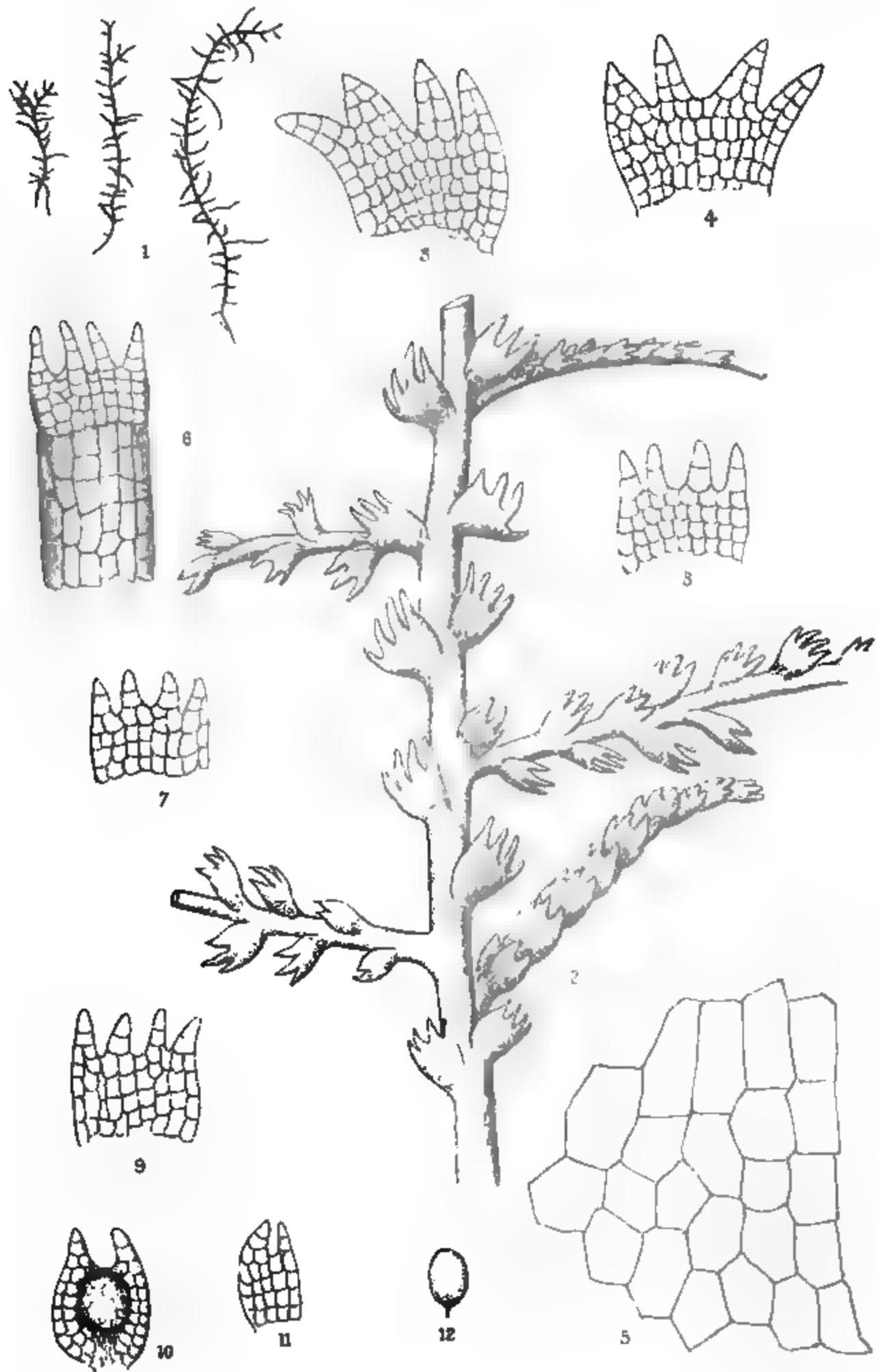
B. C. or W. H. P. del.

S. Sedgfield

*Isotachis grandis*.





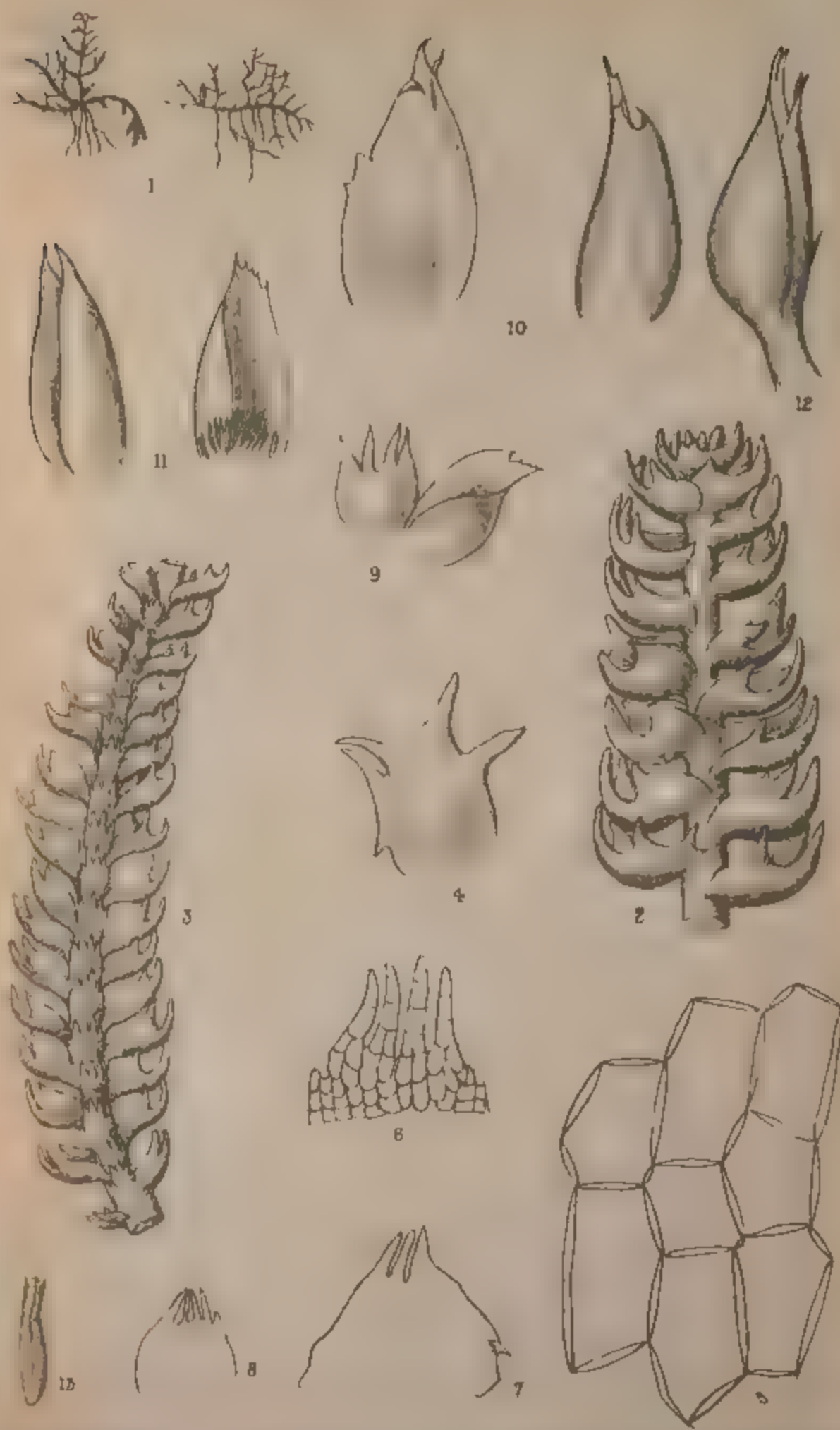


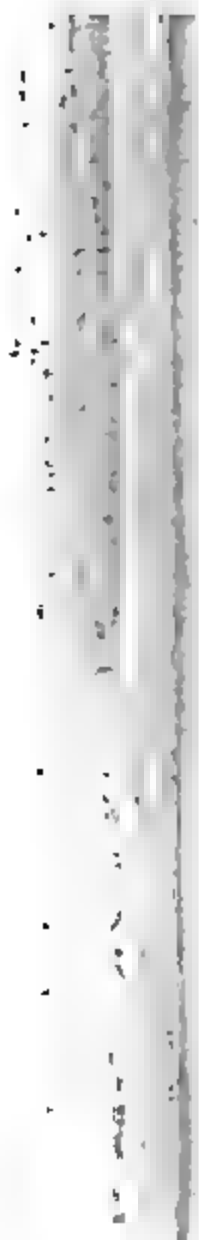
B.C. et W.H.P. del.

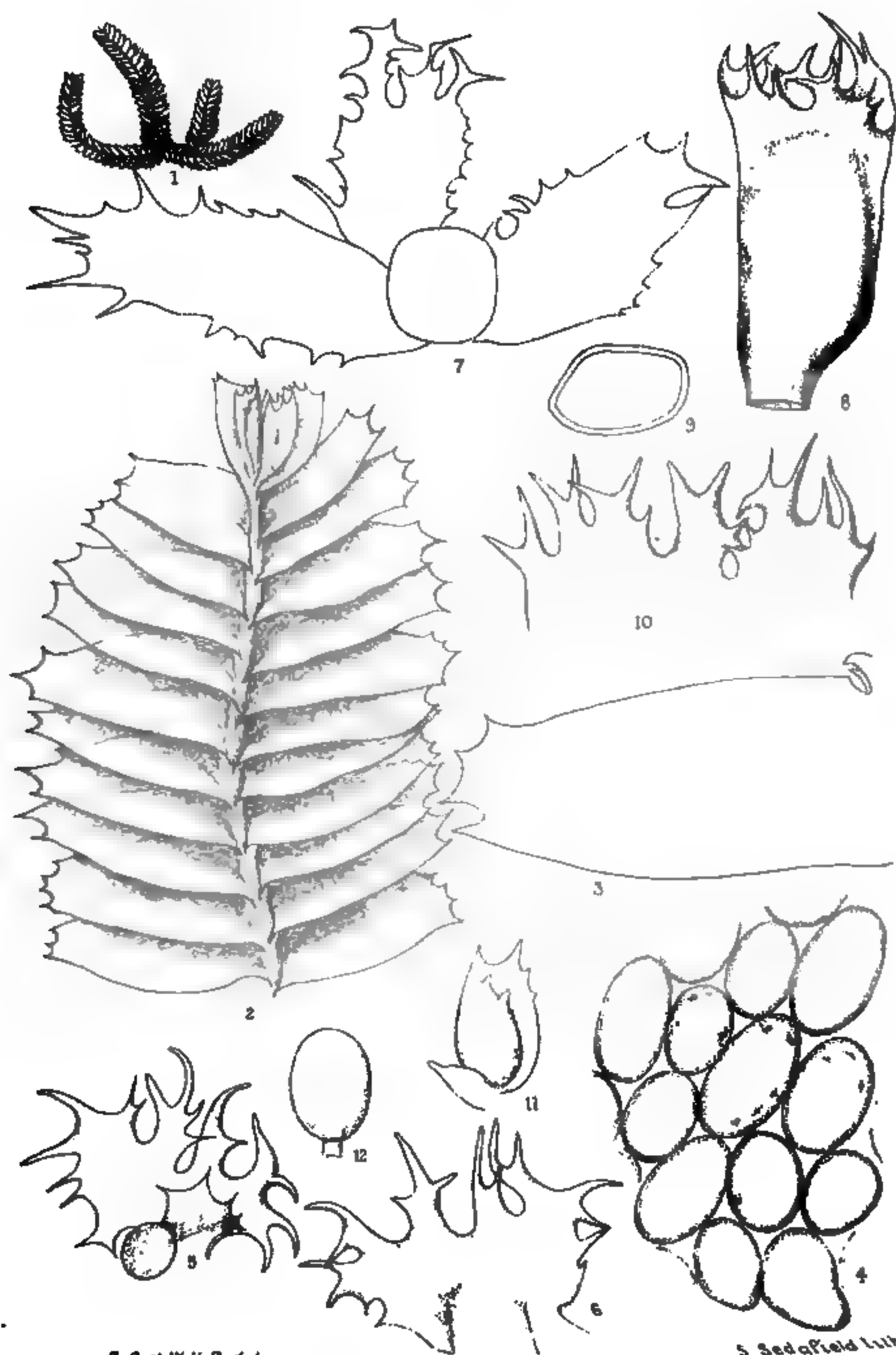
*Lepidozia gracillima*

S. Sedgfield lith.







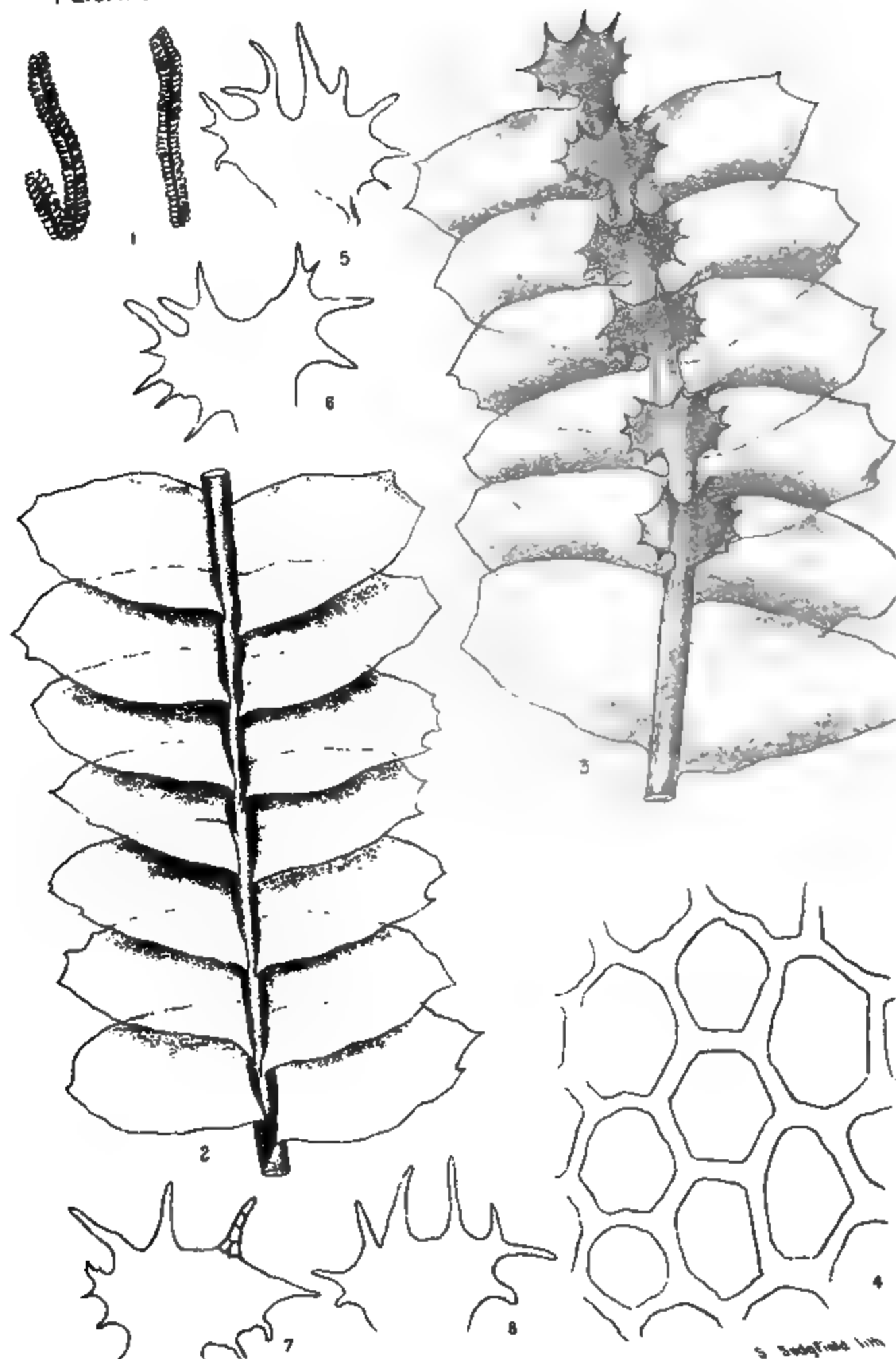


B.C. et W.H.P. del

S. Sedgfield lith

*Chiloscyphus fissistipus.*



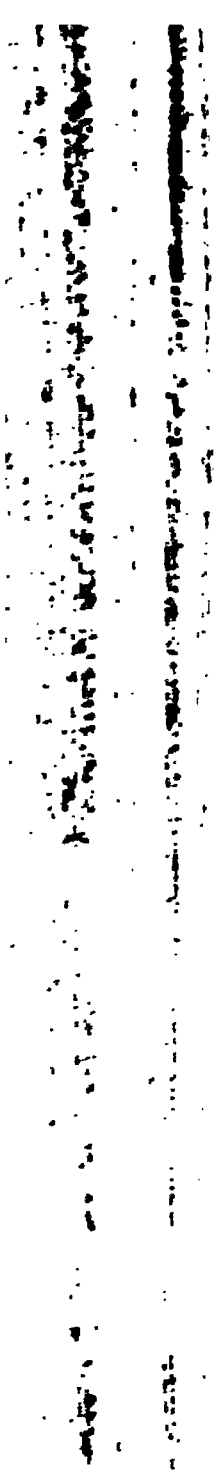


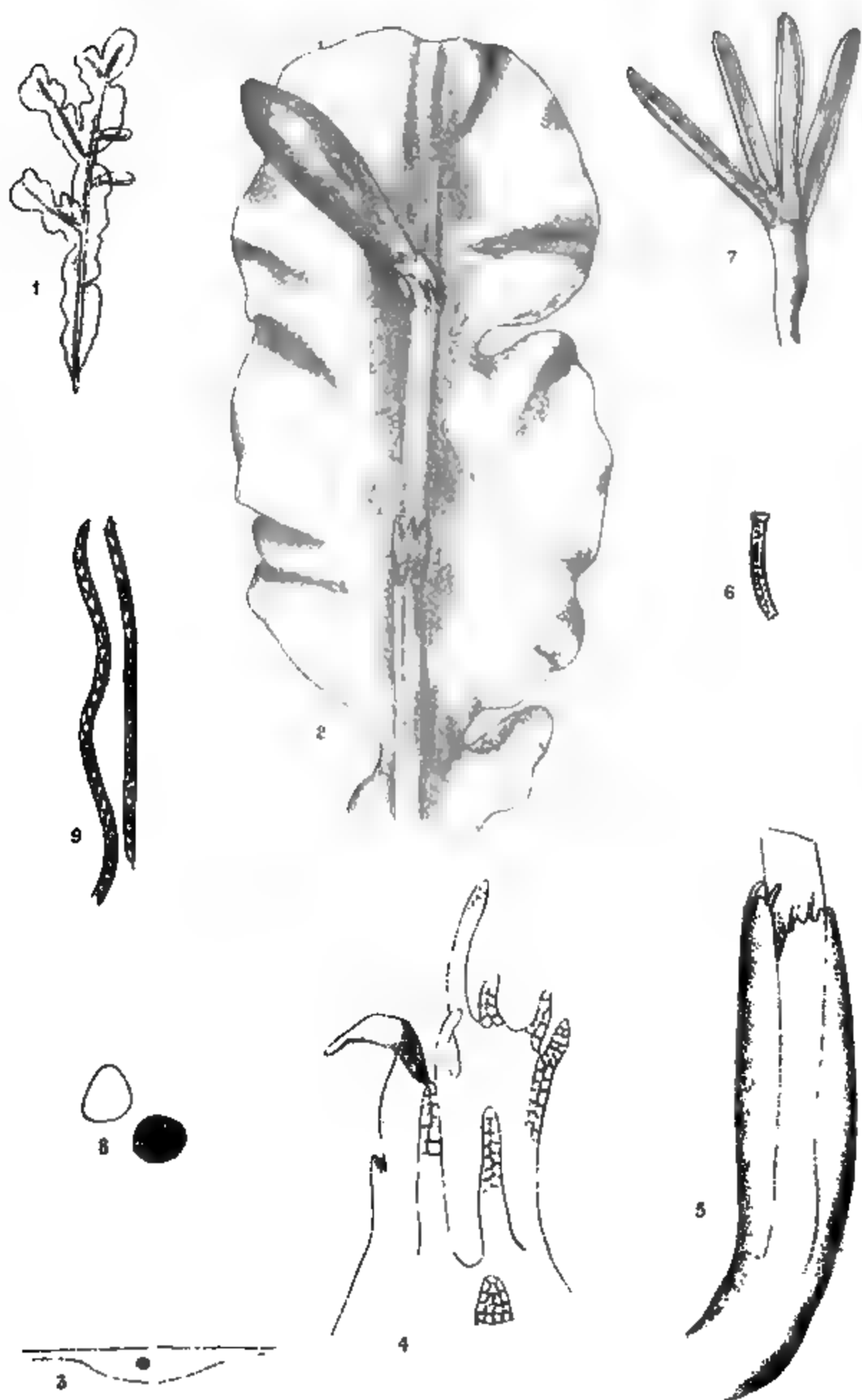
B.C. & W.H.P. del

*Phyllosymbia fissistipus*, var. *tenerimus*

S. Sedgwick lith





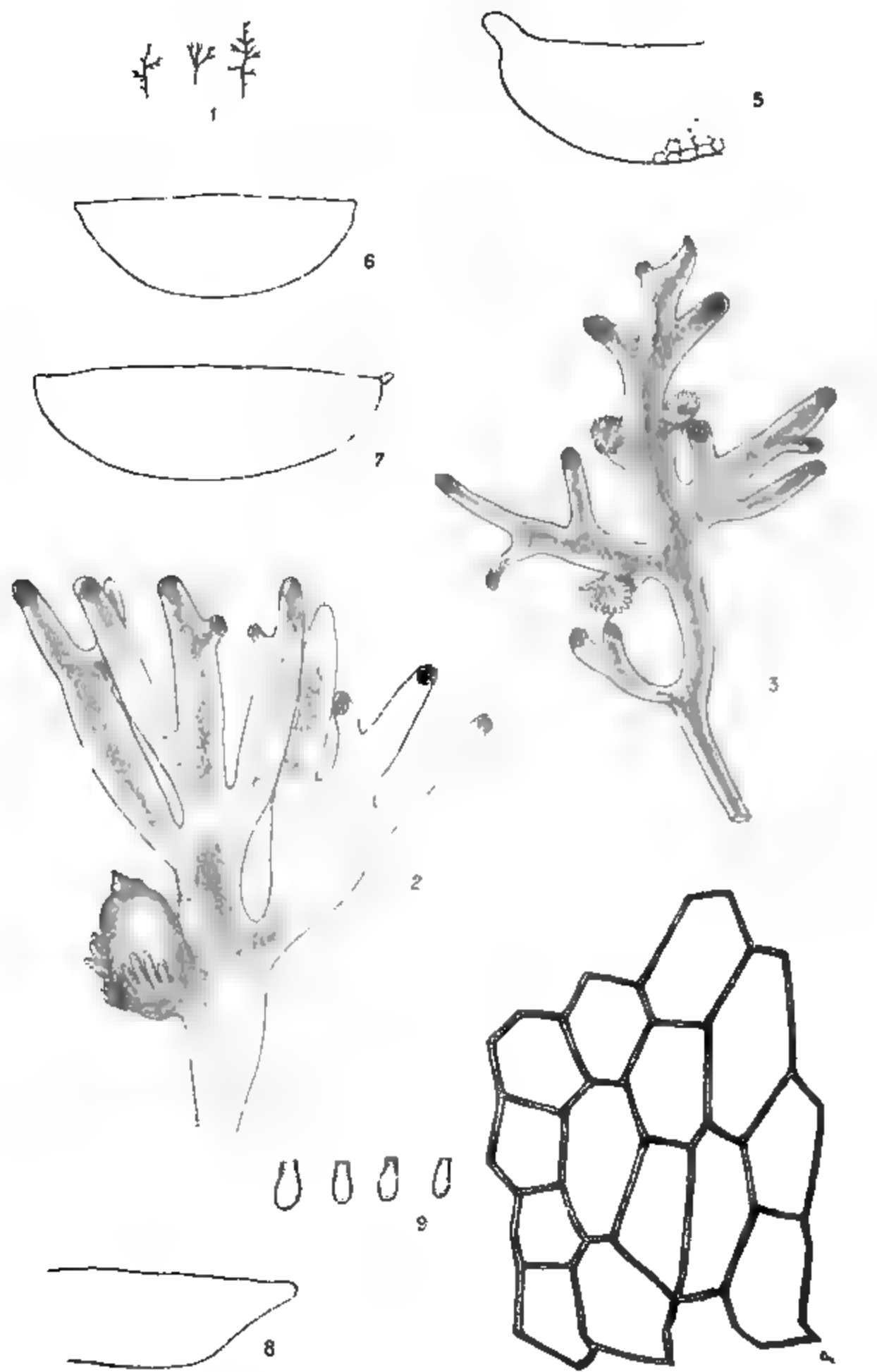


B.C. et W.A.P. del

*Symphyogyna interrupta*

S. Sedgwick lth.

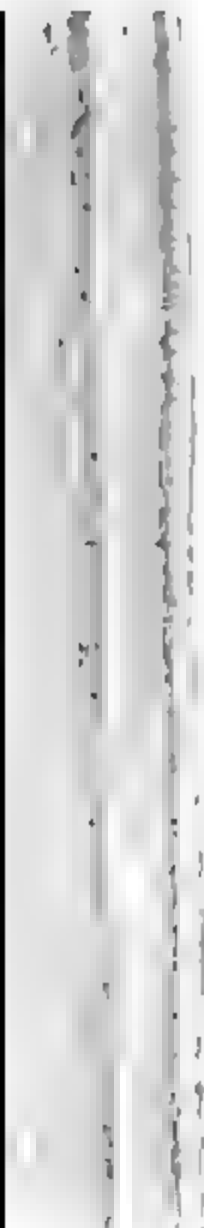
1. The first part of the document is a list of names and dates, which appears to be a record of some kind. The names are written in a cursive script, and the dates are in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right. The names are: John Smith, James Brown, William Jones, and Thomas White. The dates are: 1812, 1813, 1814, and 1815. The list is followed by a signature, which appears to be "John Smith".



B.C. of W.H.P. del

*Dicranella minima*

2 bedgfield lin

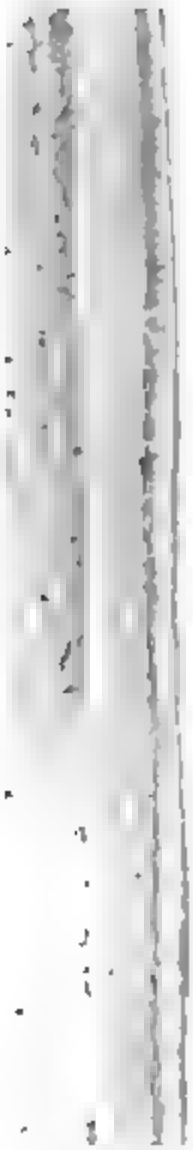




B. C. et W. H. P. del.

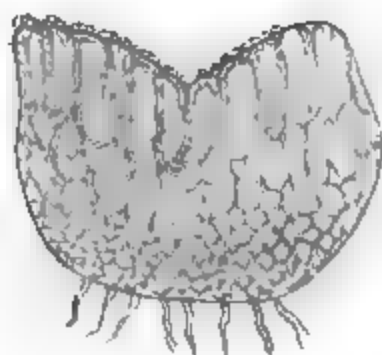
S. Sedgfield lith.

*Riccia marginata*





1



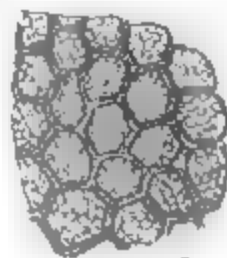
4



5



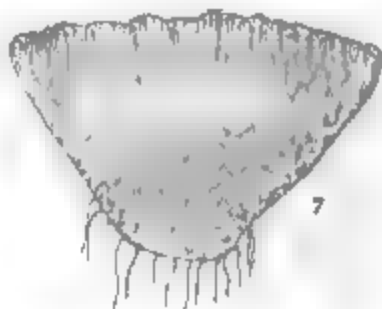
2



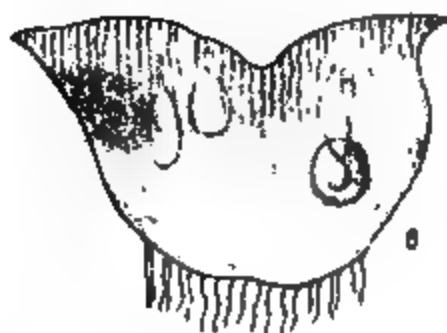
3



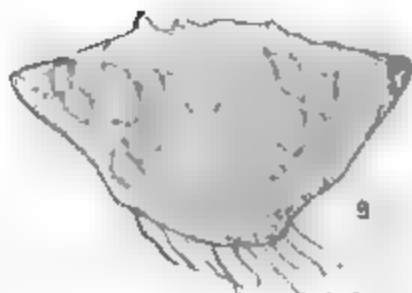
6



7



8



9

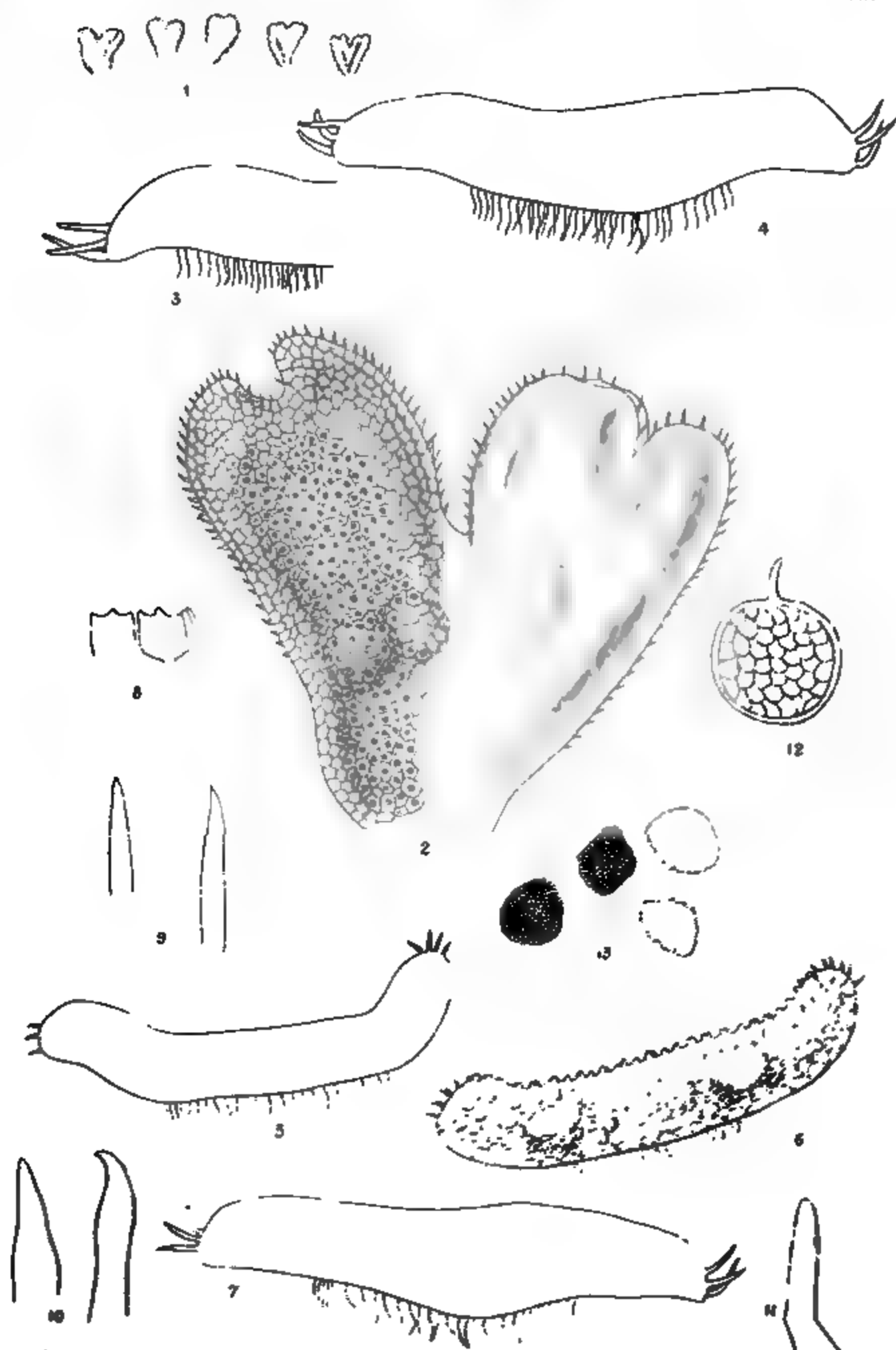
B.C. et W.H.P. del.

J. Sedgfield lith

*Riccia bulbosa* var. *vesiculosa*.







B.C. et W.H.P. del.

3. Sedgwick 1874

*Riccia acneola*

1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

2. The second part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

3. The third part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

4. The fourth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

5. The fifth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

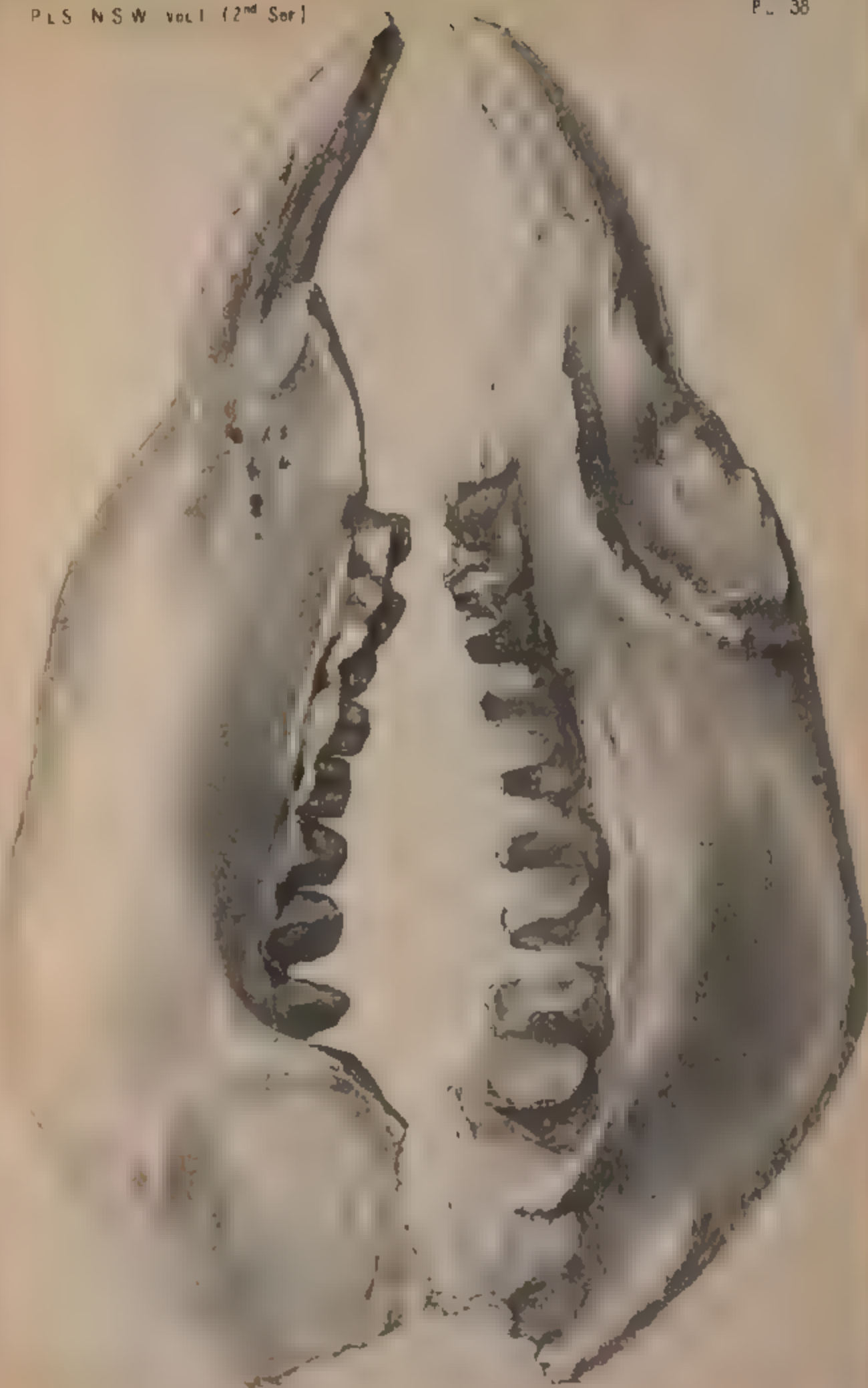
6. The sixth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

7. The seventh part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

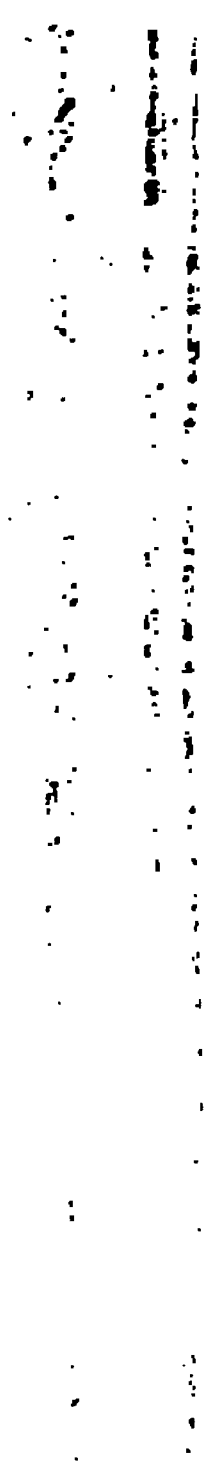
8. The eighth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

9. The ninth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

10. The tenth part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".



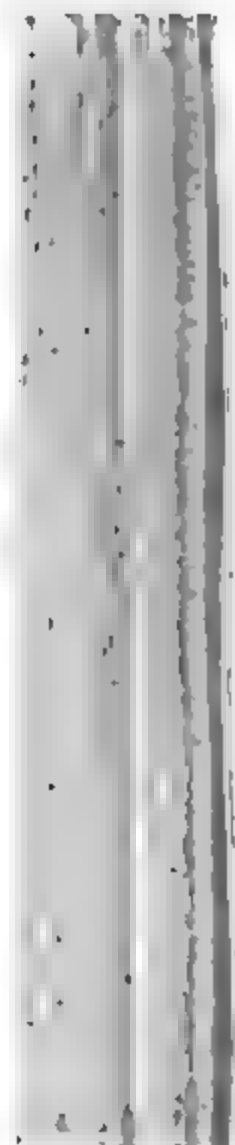
*Molotherium quense*





*Pictus imperialis*. O & P

Wm. S. L.











FOR  
USE IN LIBRARY  
ONLY  
DO NOT REMOVE  
FROM LIBRARY

510.6  
L758  
v. 2 1887

NON CIRCULATING  
DO NOT REMOVE  
FROM THE LIBRARY

FALCONER  
1881 119.